Vol. II

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1941

No. 332

THE WILLIAMS MANUFACTURING COMPANY,
PETITIONER,

vs.

UNITED SHOE MACHINERY CORPORATION

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT

PETITION FOR CERTIORARI FILED AUGUST 1, 1941.

CERTIORARI GRANTED OCTOBER 20, 1941.

United States Circuit Court of Appeals

FOR THE SIXTH CIRCUIT.

THE WILLIAMS MANUFACTURING COMPANY,
Appellant,

vs.

UNITED SHOE MACHINERY CORPORATION,
Appellee.

TRANSCRIPT OF RECORD

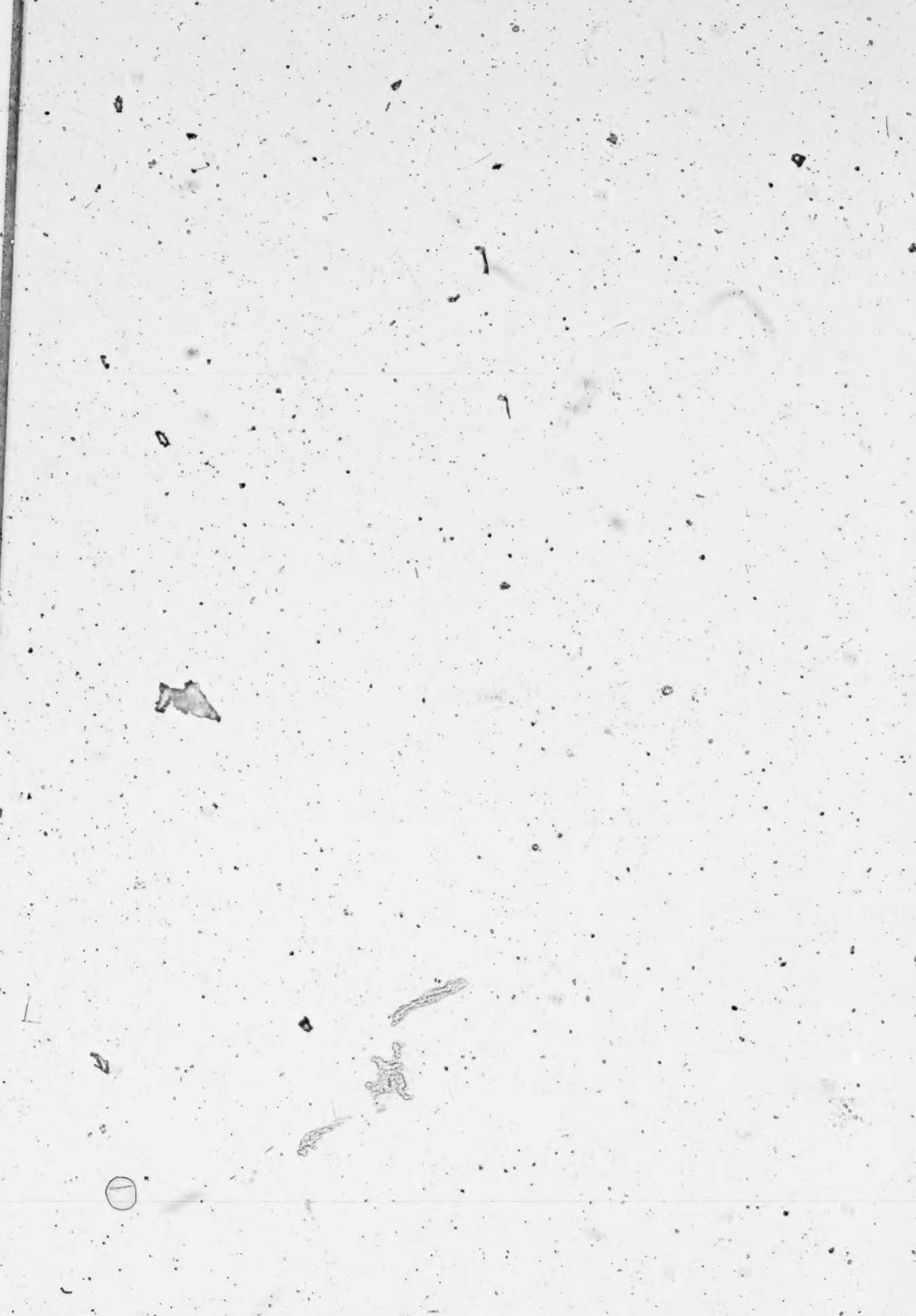
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Oct. 27, 1925. 1,558,737

R. F. McFEELY

LASTING MACHINE

Original Filed Aug. 16, 1916 6 Sheets-Sheet 1

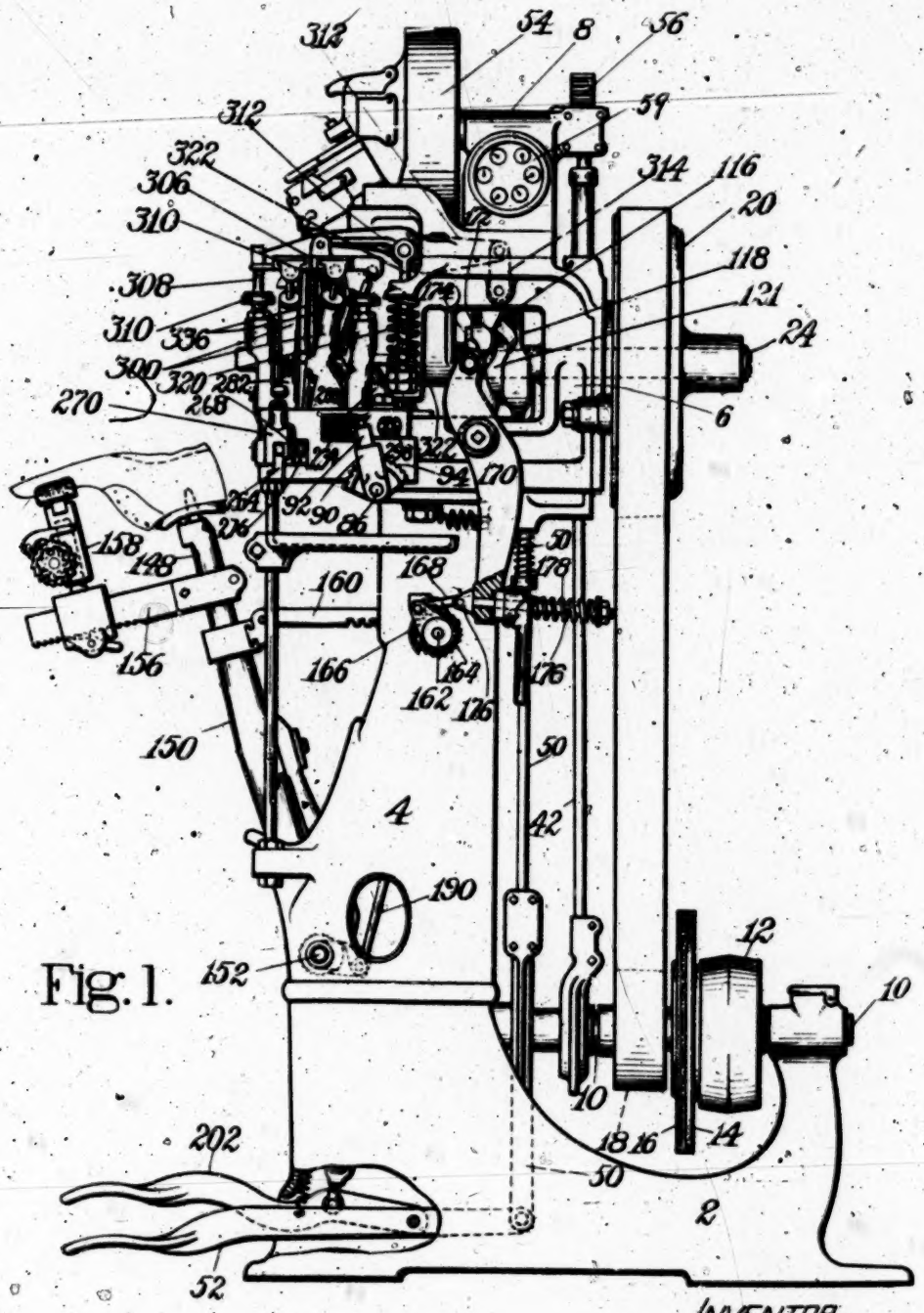


Fig. 1.

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Oct. 27, 1925. 1,558,737

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LASTING MACHINE

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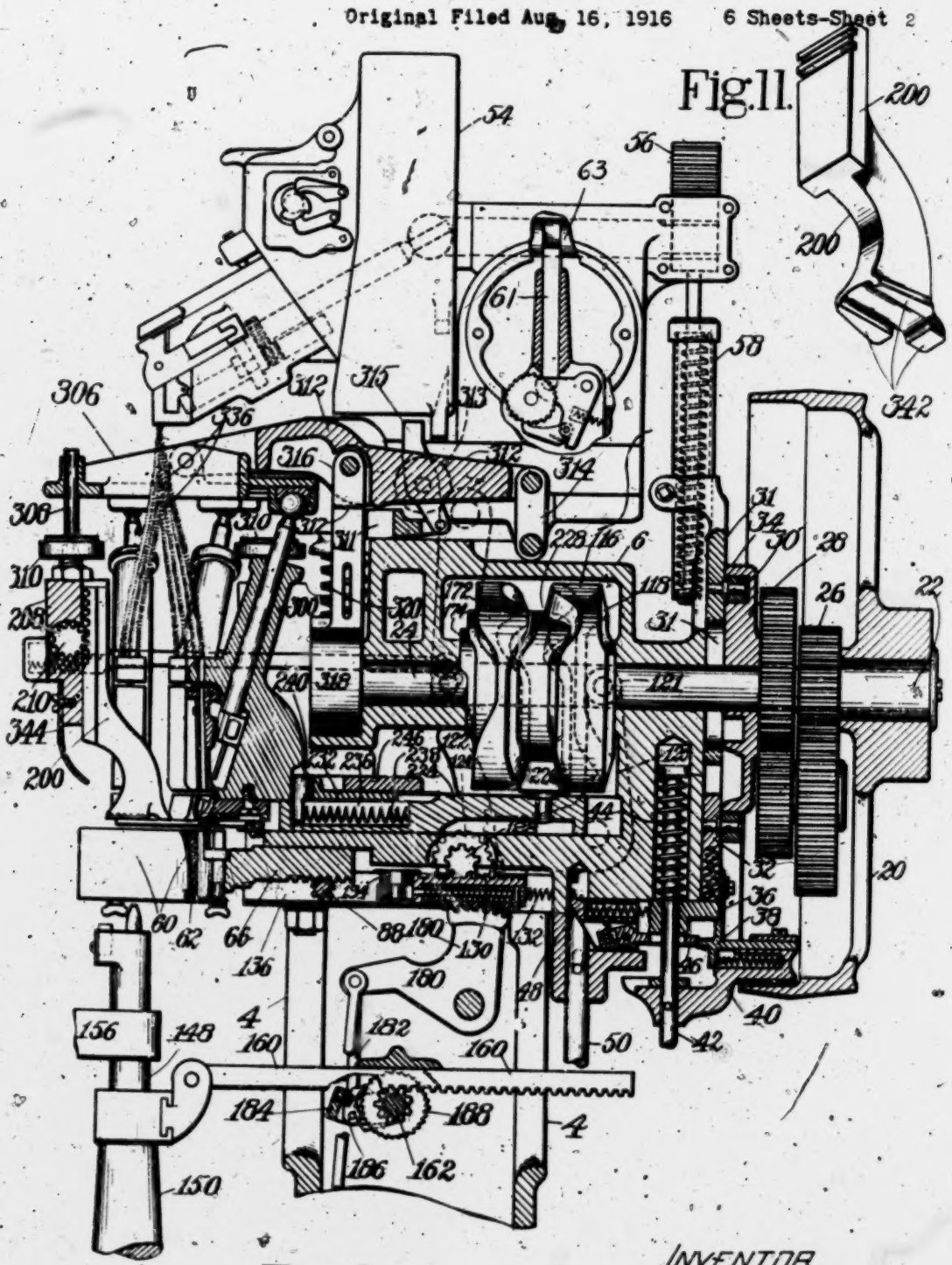


Fig. 2.

Fig. 11.

INVENTOR.

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LASTING MACHINE

Original Filed Aug. 16, 1916 6 Sheets-Sheet 3

Fig.12.

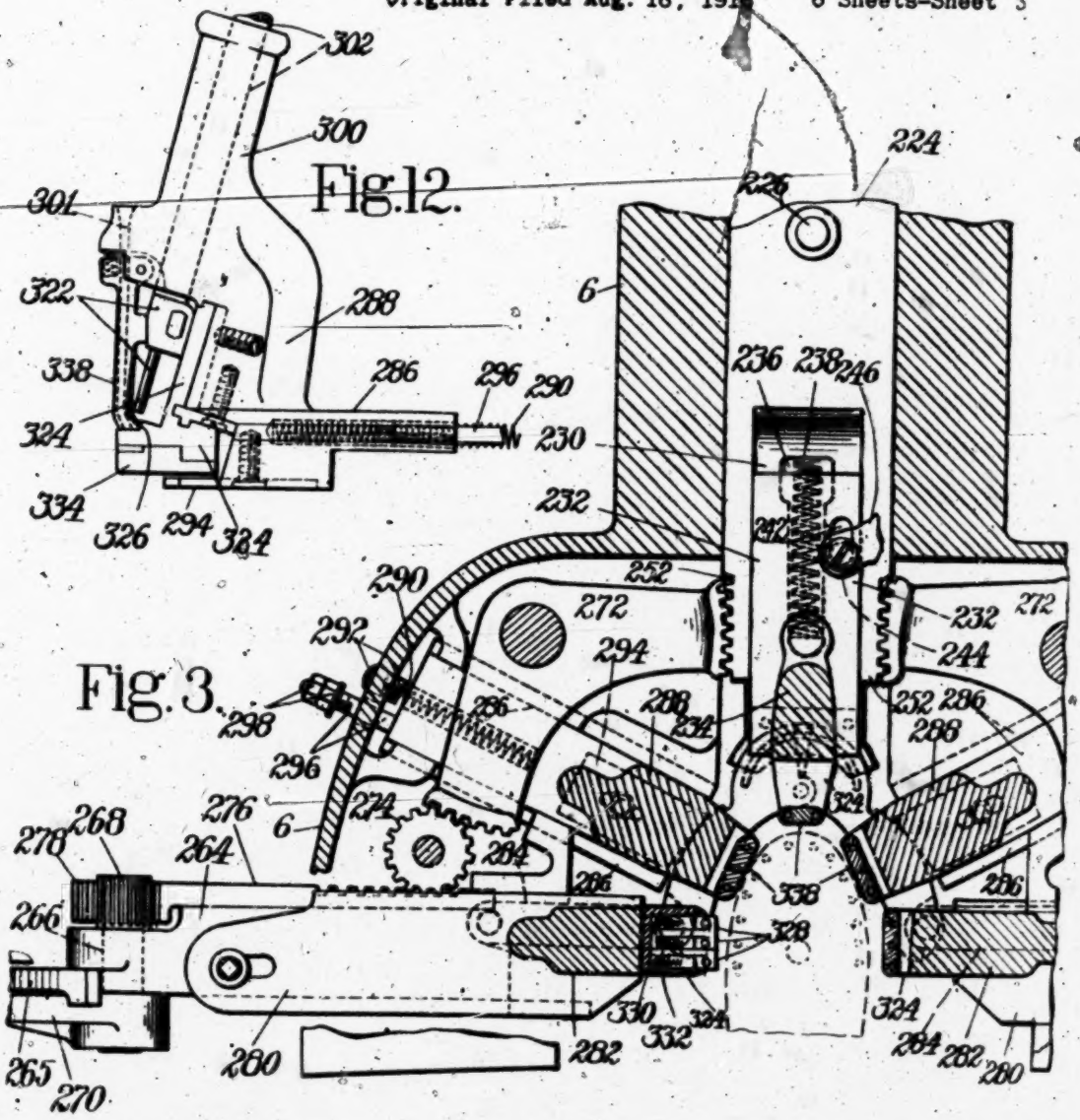


Fig. 3.



Fig.10.

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1,558,737

LASTING MACHINE

Original Filed Aug. 16, 1916 6 Sheets-Sheet 4

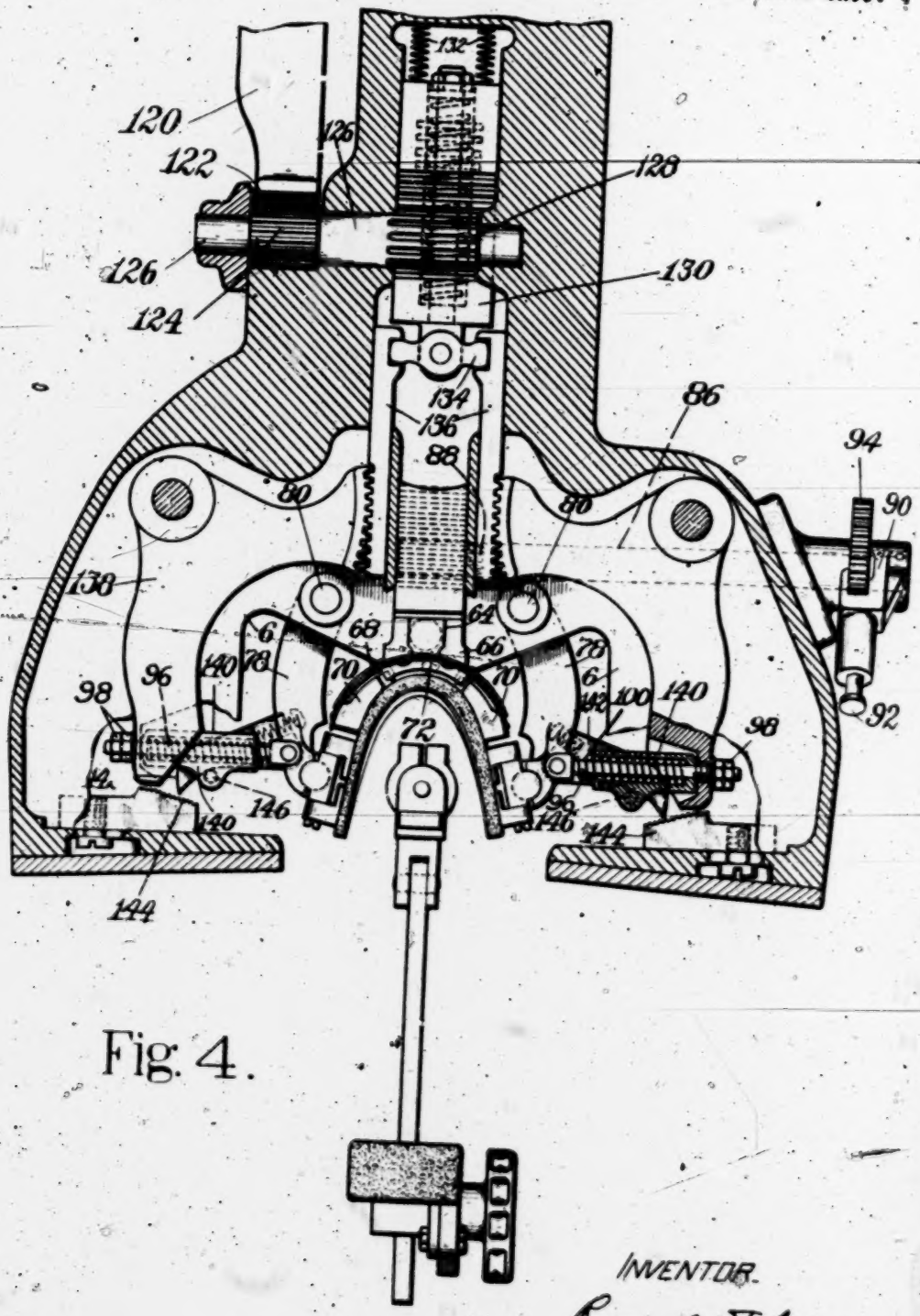


Fig. 4.

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10

Oct. 27, 1925. 1,558,737

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LASTING MACHINE

Original Filed Aug. 16, 1916 6 Sheets-Sheet

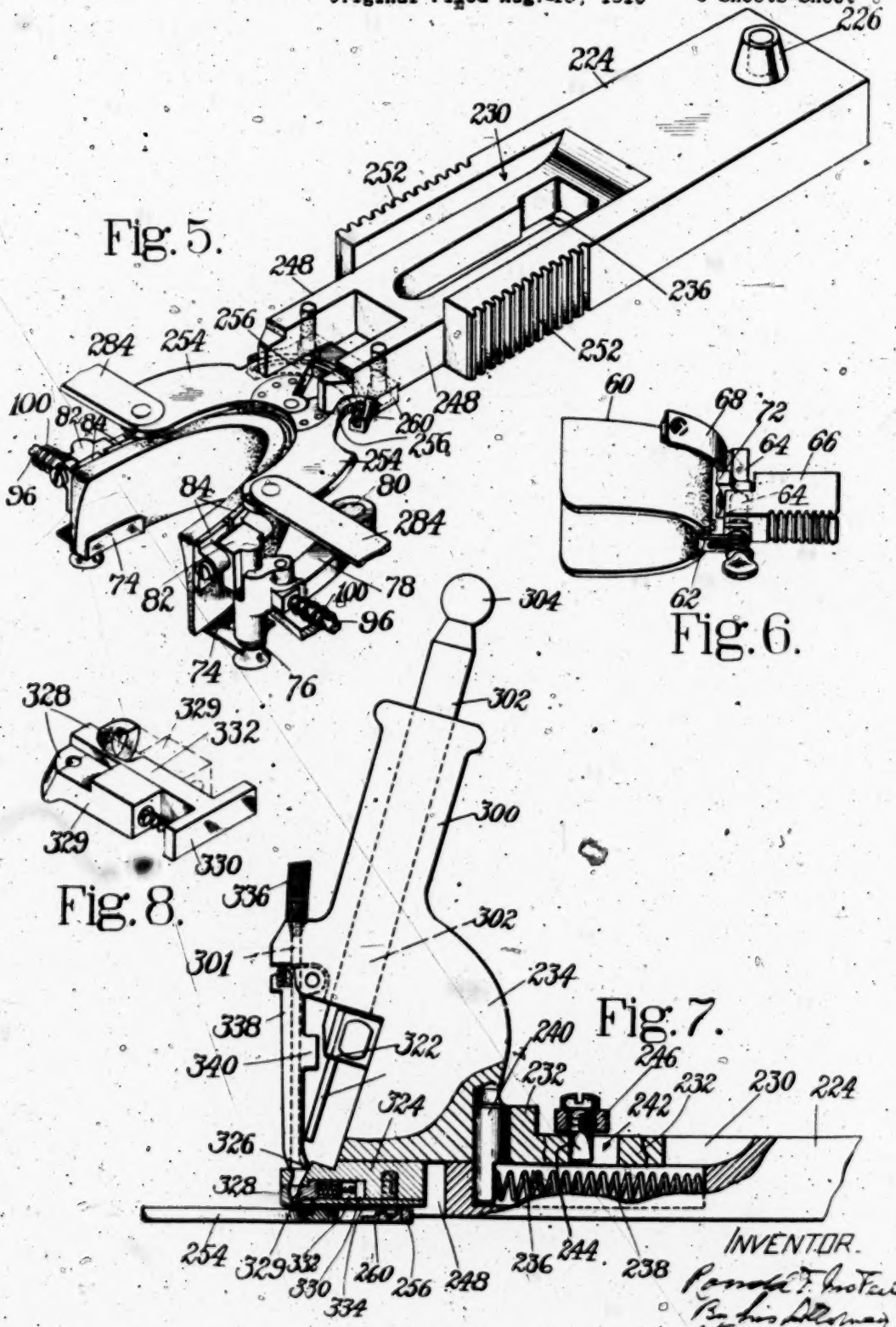


Fig. 5.

Fig. 6.

Fig. 8.

Fig. 7.

INVENTOR.

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Oct. 27, 1925. 1,558,737

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LASTING MACHINE

Original Filed Aug. 16, 1916 6 Sheets-Sheet 6

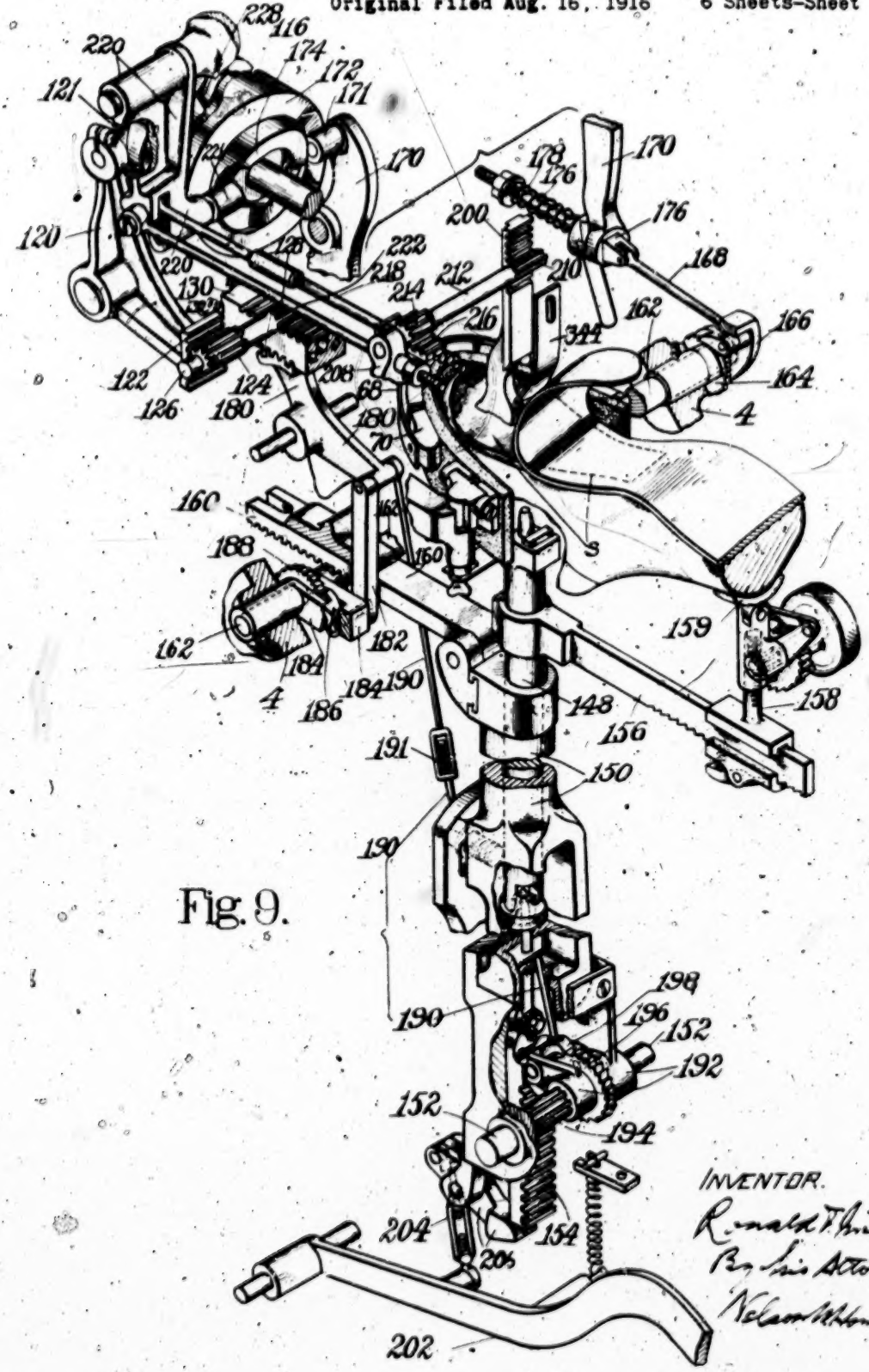


Fig. 9.

INVENTOR.
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Patented Oct. 27, 1925. 1,558,737

UNITED STATES PATENT OFFICE.

RONALD F. McFEELY, OF BEVERLY, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

LASTING MACHINE.

Application filed August 16, 1916, Serial No. 115,230. Renewed May 24, 1922. Serial No. 563,369.

To all whom it may concern:

Be it known that I, RONALD F. McFEELY, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Lasting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to lasting machines for use in the manufacture of boots and shoes, and is herein illustrated in its application to a machine for lasting the heel ends, or the heel seats, of shoes, the drawings showing a machine of the same general type as that illustrated in United States Letters Patent No. 1,129,881 granted upon my application on March 2, 1915, in which type of machine it is one of the objects of the invention to effect improvements. It will be recognized, however, that in many of its aspects and features the invention is not limited to machines of the type shown in said patent nor to machines for lasting the heel ends of shoes.

Among its important objects, the invention has generally in view the provision of certain improvements in lasting machines designed to insure better lasting on shoes in which the uppers are made of comparatively heavy materials. One way in which it is sought thus to improve the quality of the lasting on heavy shoes, as well as on shoes of the lighter grades, is by the application of heavy conforming and holding pressure to the upper about the end face of the shoe. For the accomplishment of this object the invention provides a novel organization of means for effecting relative movement between the shoe and a shoe end embracing band to seat the shoe in the band. The construction herein shown comprises means for assist in accomplishing the object in view, the invention also provides means for effecting a relative movement of the shoe and the band which is positive or of predetermined extent to increase the pressure of the band against the end face of the shoe and for locking the shoe in the band. In the construction herein illustrated a yielding rearward movement and a positive rearward movement are imparted to the shoe support in succession prior to the operation of the wipers on the shoe, the last named movement taking place simultaneously with the closing of the band; and thereafter a further positive rearward movement is imparted to the shoe support simultaneously with increased closing pressure of the band against the sides of the shoe between successive operations of the wipers, thus taking up any slack which may be occasioned by the tightening of the upper over the last in the first closing movement of the wipers and insuring a heavy pressure about the end of the shoe adjacent to the heel seat in the final overwiping operation. It is found that such application of pressure about the end of the shoe results in conforming the upper much more smoothly and tightly to the last and the insole than in the use of prior end lasting machines.

The invention also provides, as an important feature, novel means for controlling the shoe in respect to movement in directions transverse to the plane of the shoe bottom. In its embodiment of this feature, the construction shown comprises means for supporting the shoe yieldingly for a portion of the lasting operation, including in the construction shown the first operative movement of the wipers, and for holding it substantially rigid against pressure upon its bottom face for the remainder of the lasting operation. More particularly, the illustra-

ing used herein for convenience of designation, although it will be understood that the invention is not limited specifically to means for driving fastenings in the form of tacks holding and driving units to disclose the heel clamping band and its operating connections:

Fig. 5 is a detail of the heel clamping is controlled from the driven shaft 24. This heel clamping means includes a sub-

the heel seat and as the tackers are operated to fasten the upper.

As a further provision for improving the quality of the lasting, the invention provides a novel organization whereby the upper about the end of the shoe is subjected to a tightening or "upwiping" operation heightwise of the shoe. This is effected in the construction shown by automatic depression of the shoe relatively to the heel embracing band prior to the overwiping operation of the wipers, thereby drawing the upper tightly about the end of the last toward the edge of the heel seat before its margin is wiped inwardly over the heel seat. Such depression of the shoe, in the construction shown, is effected by a holddown which engages the heel seat face of the shoe and which serves thereafter, in co-operation with the shoe support, to control the shoe during the remainder of the cycle of the machine in the course of which the shoe is uplifted, as hereinbefore explained, between repeated operations of the wipers. It is also a desirable characteristic of the illustrated machine that in such uplifting of the shoe the band moves with the shoe by reason of the manner in which it is supported, thereby avoiding any tendency for the band to wipe the upper reversely from the edge of the heel seat which might counteract in some degree the beneficial results of the upwiping operation. To position the shoe initially for the lasting operation, the machine herein shown has manually operated means for jacking the shoe upwardly against the holddown prior to the starting of the machine, and the provision of such means for presenting the shoe, in combination with power means for subsequently controlling the shoe, constitutes another feature of the invention.

As a further feature, the invention provides a novel construction of end embracing wiper mechanism including, among other improvements, a novel and convenient means for effecting relative adjustment of the wipers to conform them substantially to the shape of different shoes, for example to the different contours of the heel ends of right and left shoes. Such provision for adjustment is combined, in the construction shown, with means for imparting to the wipers positively an advancing and closing movement of predetermined extent, thereby insuring uniformly effective results on heavy shoes which offer comparatively great resistance to the overwiping operation.

Still other important features of the invention are to be recognized in a novel combination and arrangement of wiper and tacker mechanisms, the term "tacker" being used herein for convenience of designation, although it will be understood that the invention is not limited specifically to means for driving fastenings in the form of tacks. The machine illustrated includes in its organization what may be conveniently termed "side" tackers, arranged to drive their tacks near the front end of the heel seat, an "end" tacker at the extreme end of the shoe, and "corner" tackers between the side and end tackers, the several tackers being moved inwardly under control of the wipers. For the purposes in view, the side tackers in the construction shown are positively connected to the wipers to be moved inwardly by the wiper operating means to predetermined tacking positions, while the end and corner tackers, where the gathers in the margin of the upper oppose comparatively heavy resistance to the advance of the wipers and tackers, are permitted to yield in response to such resistance while the wipers continue their inward movement, this being particularly advantageous in the first operative movement of the wipers for gathering the margin of the upper and laying it over the heel seat. The connection of the side tackers to the wipers results in their adjustment with the wipers when the wipers are adjusted as hereinbefore explained. The invention also provides for adjustment of the different tackers relatively to the wipers, as may sometimes be desirable for varying the tacking positions, the adjustments for the end and corner tackers determining the limits to which these tackers are moved by their yielding operating means. It is a further desirable characteristic of such limiting means that these tackers are prevented from moving too far inwardly during the first two advancing and closing movements of the wipers, thus avoiding interference with the holddown which otherwise might be engaged by these tackers.

The above and other features of the invention, including novel shoe end clamping means, novel means for turning and holding back the heel end of the sole of a turn shoe, and various details of construction and combinations of parts, will now be more particularly set forth by reference to the accompanying drawings and pointed out in the claims.

In the drawings;

Fig. 1 is a view in side elevation of the assembled machine;

Fig. 2 is a vertical section through the head of the machine, the parts being shown on an enlarged scale;

Fig. 3 is a fragmentary horizontal section on an enlarged scale taken along an irregular line through the lower portions of the tack holding and driving units;

Fig. 4 is a horizontal sectional view through the machine taken on a line below the tack holding and driving units to disclose the heel clamping band and its operating connections;

Fig. 5 is a detail of the heel clamping

band, wiper plates and their operating slide in assembled relation;

Fig. 6 is a detail of the rear end support of the clamping band;

Fig. 7 is a side elevation, partly in section, of the heel end tack holding and driving unit mounted on its operating slide with the heel wipers in position on the slide;

Fig. 8 is a detail of the tack holding and driving unit construction;

Fig. 9 is a fragmentary perspective view of the last jack and hold-down with their operating mechanisms;

Fig. 10 is a plot of the cam paths on the main cam wheel;

Fig. 11 is a detail of the hold-down; and

Fig. 12 is a side elevation of a corner tacking unit.

As to general structure, power transmission and automatic control the machine shown herein corresponds to the machine shown in my Patent No. 1,129,881, previously referred to.

The machine is provided with a base 2 from which rises a column 4 terminating in a head 6 carrying the heel seat lasting mechanism. This head is crowned by a frame 8 which carries a tack hopper and delivering mechanism.

A driving shaft 10 is journaled in the base 2 of the machine frame and carries a fast pulley 12 which is driven by a belt from a suitable source of power such as the usual line shaft, and is provided with a friction clutch disk 14. A second pulley 18 is loosely mounted on the shaft and is provided with a co-operating clutch disk 16. This second or loose pulley is connected by a belt with a pulley 20 fastened to a sleeve 22 freely rotatable upon a driven shaft 24 and carrying a gear 26 at its inner end within the pulley 20. This gear drives the shaft 24 through suitable intermeshing reducing gears as shown in Fig. 2.

Adjacent to its rear end, shaft 24 carries a cam disk 28 having a cam groove 30 formed in its front face into which extends a roll carried by a reciprocating frame 31 having a yoke formation to straddle the shaft 24.

The movement of the shaft 24 is controlled by mechanism which may be substantially like that shown and claimed in my prior United States Letters Patent No. 791,986 of June 6, 1905. This mechanism need not be here more fully described than to state that a clutch operating rod 42 carries near its upper end a brake block 40 co-operating with the inner face of pulley 20, with a spring 44 operating against its upper end and normally tending to move it upwardly to release the brake 40 and throw in the friction clutch 16 on shaft 10. The cam wheel 28 has a peripheral cam face 34 operating against a roll on a sliding block 32 to cause a trigger plate 36 to engage a sliding spring latch 38 on the brake block to hold the brake against the pulley and against upward movement through the action of spring 44 until the latch is moved away from plate 36 by a finger 46 carried by a wedge block 48, this block being moved to operate the finger and release the latch and brake through a rod 50 operated by a treadle 52. Toward the end of a revolution the plate 36 is permitted to rise by the cam 34, the latch 38 moving over beneath the plate and being subsequently depressed by the operation of cam 34 against the plate to move the brake block 40 and rod 42 downwardly to disconnect the clutch and stop the driven shaft 24 at the end of the revolution.

The machine includes suitable tack feeding mechanism which may be and is shown herein as corresponding to the tack feeding mechanism of Patent No. 1,129,882 of March 2, 1915, except that, as shown, fourteen tacks are employed and the number of tack pockets in the receiving plates and the number of raceways and slots, are varied accordingly.

Briefly, the tacks are fed from a hopper 54 which is oscillated by a rack bar 56 through a yielding spring connection 58 with the upper end of the sliding frame 31 reciprocated through the cam 30. The tacks gravitate down a series of seven raceway grooves from the hopper to a separating slide which is arranged to be reciprocated twice in each cycle of the machine to deliver fourteen tacks to a receiving plate having fourteen tack pockets therein from which the tacks are discharged into conductor tubes leading to tack holding and driving units. An indicator such as is usually employed with machines of this character, is located at 59 (Fig. 1) and may be of any usual form. As shown (Fig. 2) the indicator mechanism is actuated by a plunger 61 connected to an eccentric portion of the hopper shaft 63.

The conductor tubes, as previously stated, lead to certain tack holding and driving units. These units are mounted within the head 6 of the machine frame and co-operate with wiping mechanism which is arranged to wipe down the marginal portions of the shoe upper over the edges of the insole at the heel end of the shoe, the tacks being subsequently driven. The last with the upper and insole mounted thereon is carried by a swinging vertically movable jack and is held in position relatively to the wiping and tack driving mechanism with its heel end within certain heel clamping means, which, together with the tack-holding and driving units, wiping mechanism, and jack, is controlled from the driven shaft 24.

This heel clamping means includes a sub-

stantially U-shaped integral band 60, of leather or other flexible material having a slotted clip 62 attached to its rear lower edge and supported by and guided for vertically upward movement on the shank of a stud 64 secured to the forward end of a racked slide 66 (see Fig. 6). The upper end of the stud supports a curved flexible steel band 68 having concave contact blocks 70 on its inner face arranged yieldingly to engage the back of the band 60 at opposite sides of its longitudinal median line flexibly to conform the rear of the band to the end of the last and shoe upper. A positive back stop between the upper and lower edges of the band and substantially in the longitudinal median line thereof is provided in the form of a block 72 carried by the stud 64 and having a concaved band engaging face substantially in the vertical plane of the corresponding contact blocks 70.

The forward ends of the clamping band are slidably supported by flanged clips 74 clamped to vertical studs 76 at the forward ends of links 78 pivoted at their rear ends to the head 6 (Fig. 4) at 80. Blocks 82, swiveled on studs 76, carry complemental pivoted plates 84 contacting with the opposite side faces of the clamping band adjacent to its upper edge. Pressure acting against the links 78, will, through these plates 84, cause the band to be clamped about the counter portion of a shoe upper positioned within the band. Movement of the band relatively to the pressure plates 84 will vary the pressure point on the band so that by adjustment, the clamping pressure may be applied substantially at the same relative point on all lasts and shoes. The horizontal pivot mounting for the contact plates 84 causes said plates automatically to conform to the contours of the side faces of the lasts.

Adjustment of the band is secured by manually effected movement of the racked slide 66. This slide is suitably guided in the head 6 for movement toward and from the front of the machine. A spindle 86 is journaled in and extends transversely of the head and has a toothed end 88 co-operating with the racked slide, its opposite end projecting beyond the head 6 and carrying an arm 90 provided with a spring pressed pawl 92 co-operating with a stationary arcuate ratchet 94. Obviously, on pulling the pawl from engagement with the ratchet, the arm 90 and spindle 86 may be swung to move the racked slide and effect desired adjustment of the clamping band in the manner previously described. The clamping band 60 in its rearmost position is adapted to accommodate a heel end of maximum size. Adjustment of the band forwardly positions it for smaller sizes, the adjustment for which may be indicated on the ratchet 94. In such adjustments the contour of the band is determined by the members 74 and 84 relatively to which it is slidingly movable.

The driven shaft 24, at a point within the head 6, carries a cam wheel 116 having its rear face formed as a cam 118 constructed and arranged to control the clamping and releasing movements of the heel band 60, and automatically to effect and control movements of the last-carrying jack in the manner later to be described. A bell crank lever 120 (Fig. 9) is pivoted at one side of the head 6 and carries at one end a roll 121 arranged to engage the cam 118, its other end being formed as a segmental rack 122 engaging and arranged to rotate a gear 124 carried at the outer end of a spindle 126 whose inner end is formed as a pinion 128 and engages with a rack on the upper face of a racked plate 130 positioned and guided in the head 6 for reciprocation in a horizontal plane slightly below the plane of the racked slide 66 as shown in Fig. 2.

The racked plate 130 is normally pressed outwardly and the bell crank roll 121 is held against cam 118 by means of coiled springs 132 acting against the plate. An equalizer 134 is pivotally mounted on the front end of a stem carried by and extending through the racked plate 130 and yieldingly held against forward movement relatively to the plate by a spring. The equalizer engages notches in the sides of opposed rack bars 136 guided within the head 6 for horizontal sliding movement in the plane of plate 130 and positioned forwardly of the plate.

At opposite sides of the heel band, bell crank levers 138 (Fig. 4) are pivoted to the head 6 and have their rear ends formed as racked segments to co-operate with racks formed on the outer faces of the oppositely disposed bars 136 which are reciprocated through the equalizer when the racked plate 130 is reciprocated through bell crank 120 and cam 118. The forward ends of the bell crank levers 138 are formed with transverse sockets within which are seated the outer ends of the tubular housings 140. Link rods 96 have their inner ends pivotally attached to the forward ends of the links 78 and have their outer ends extended through the outer ends of the tubular housings 140 and loosely fitted in and inserted through the perforated ends of the sockets in the bell crank levers 138. The outer extremities of the link rods carry nuts 98 or other suitable means to retain them in connection with their bell crank levers. Coiled springs 100 are seated within the housings 140 between the outer ends of the housings and the forward ends of the links 78 and provide a yielding connection between the bell crank levers 138 and the heel band clamping links 78.

When bell crank 120 turns the pinion

spindle 126 in one direction, the racked plate 130 will be moved rearwardly and through the equalizer 134 will move the bars 136 rearwardly, in turn moving the forward ends of the levers 138 toward the heel band 60 and through the yielding connection with the links 78 forcing the heel band ends inwardly and forwardly into contact with the counter portion of the shoe. Spring pressed pawls or detents 142 are pivoted at their inner ends on the links 78 and normally tend to engage their outer ends with fixed ratchet plates 144 adjustably secured to the frame of the machine, but are prevented from doing so by pins 146 carried by and extending downwardly from the housings 140. When the bell crank levers 138 are moved inwardly toward the clamping band, the tubular housings 140 engaged by these levers are similarly moved, and the pins 146 will be moved relatively to the spring-pressed detents to permit their springs to move them into engagement with the ratchet plates 144 so that when the shoe counter is firmly clamped, the detents 142 will have been moved into engagement with the stationary ratchet surfaces and will hold the heel band firmly clamped to the shoe until the levers 138 are reversely moved to release the heel band, whereupon the pins 146 will engage the sides of the detents 142 to force them from engagement with the ratchet surfaces.

The jack for supporting the last with the upper and insole attached thereto comprises a standard 148 (Figs. 1 and 9) suitably guided in a casing 150 journaled on the shaft 152 which is, itself, journaled in the column 4 of the machine frame. The standard has its lower end provided with a rack 154 and has a heel pin and last support at its upper end. Adjacent to its upper end the standard supports a forwardly projecting toe rest bar 156 having thereon a horizontally adjustable toe rest support 158 on which a toe rest 159 is mounted for vertical adjustment. To the casing 150 adjacent to the upper end of the standard is pivoted the front end of a rearwardly extending rack bar 160 operated by certain mechanism to swing the casing and standard rearwardly to force and hold the heel of the shoe against the heel clamping band. The rack 154 at the lower end of the standard is arranged to be operated by power to

naled upon this outer end of the shaft and is connected by a link 168 to the forward end of a rod 176 with which the lower end of a lever 170 has a yielding connection. The upper end of the lever carries a roll 171 (Fig. 9) bearing against the outer cam surface 172 (Figs. 9 and 10) of two concentric cam surfaces formed on the front face of the cam wheel 116. A coiled spring 178 encircling the rod 176 bears against the lower end of the lever 170, forming a yielding connection between the lever 170 and the arm 166 carrying the driving dog. Preferably, means are provided for adjusting the tension of the spring 178, such as the ratchet wedge block and the co-operating ratchet abutment handle shown in the drawings.

The plate 130 whose upper face is formed with a rack engaged by the pinion 128 has its under face similarly formed and engaged by a segmental rack on the upper end of a bell crank lever 180 (Figs. 2 and 9) pivoted on the machine frame. A link 182 is pivoted to one side of this bell crank lever and extends downwardly to and is pivotally connected with a rock arm 184 carried by a sleeve journaled in the side of the frame column 4 and turning freely on the spindle 162. This rock arm carries a spring-pressed driving dog or pawl 186 arranged to engage a ratchet wheel 188 on the spindle 162 to swing the standard backwardly.

A vertically upward movement of the standard is coincidently effected by a sectional rod 190 extending from the opposite side of the lower end of the bell crank lever 180 to a bifurcated rock arm 192 journaled on the shaft 152 on which the standard casing 150 is journaled to swing and having a spring 191 interposed between its parts to provide a pulling connection. The shaft 152 carries a pinion 194 meshing with the standard rack 154 and also carries a ratchet wheel 196 engaged by a driving dog 198 mounted on the rock arm 192 so that upward swinging movement of the lower end of bell crank lever 180 operates to move the standard and last not only backwardly against the heel band but also upwardly against the hold-down and to hold them in this position, the backward pressure of the extremity of the shoe against the band being unyielding since the jack is positively

machine cycle operates to move the roll 221, swing the lever 220 and move the hold-down foot prior to and coincidently with the lifting of the jack standard in the manner later to be described.

through the cam 228, the double-racked bell cranks 272 will rotate the pinions 274 to move the slides 276 inwardly toward the

the plates as a center. To the under side of the legs 248 of the block 224 a plate 260 is secured, this plate extending forwardly and having a tongue and groove correspondingly curved to receive the ar-

of these units has a longitudinal bore in the outer end of its base plate to receive a coiled spring 290 whose outer end extends into a

will be evident from the plot of the cam paths shown in Fig. 10.

The previously described shoe upper clamping and last jack lifting and swinging movements occur at the beginning of the machine cycle. Preparatory to starting the machine, the operator positions the last with its attached upper and insole on the heel pin of the standard and adjusts the toe rest 158 properly to position the last and upper for engagement by the clamping band 60. He then swings the casing 150 inwardly and at the same time depresses a treadle 202 to raise the standard 148 to position the last at the proper elevation to be engaged by the hold-down 200.

This treadle, adjacent to its inner pivoted end, carries the lower end of an adjustable link 204 whose upper end is pivoted to the rear end of a lifting foot 206 in turn pivoted to the base of the casing 150 and having its front end positioned to engage the base of the rack bar 154 of the jack standard. Depression of the treadle 202, therefore, acts to lift the standard 148 to effect preliminary positioning of the last and upper.

The hold-down 200, previously referred to, is guided for vertical movement in a head 208 (Fig. 2) forming an extension of the head of the machine frame. Adjacent to its upper end, one face of the hold-down is formed with rack teeth meshing with a pinion 210 on one end of a spindle 212 journaled in said head and having a second pinion 214 thereon adjacent to its opposite end. This second pinion is engaged by a rack bar 216 guided in the head 208 and carried at the forward end of an adjustable rod 218 whose rear end is pivoted to one side of an offset bracket on a cam-actuated lever 220 journaled at its upper end on the machine frame and having its lower end provided with a roll 221 co-operating with the inner cam surface 174 on the front face of the cam wheel 116. A second and substantially parallel rod 222 is pivoted to the other side of said offset bracket on the cam-actuated lever 220 and extends through the head 208 (Fig. 9), its end carrying a stop nut adjustably to limit the degree which a coiled spring within the head and acting against the forward end of the rack bar 216 (Figs. 2 and 9), may swing the lever rearwardly to hold the lever roll against the cam 174. By adjusting this stop nut, the position of the roll 221 relatively to cam 174 may be varied and consequently the degree to which the hold-down is moved during the lasting operation. The cam 174 at predetermined times in the machine cycle operates to move the roll 221, swing the lever 220 and move the hold-down foot prior to and coincidently with the lifting of the jack standard in the manner later to be described.

The upper mounted on the last, when clamped and held in proper position, is operated upon by wiper mechanism to wipe over the marginal edges of the upper standing above the insole, and subsequently a series of tacks are driven in the wiped over edges. Accordingly, the machine bed at a point above the racked plate 130 is formed with guideways to receive a sliding block 224 (Figs. 2, 3 and 5) having projecting upwardly from adjacent to its rear end a roll 226 extending into and engaging the sides of a peripheral cam groove 228 in the cam wheel 116.

The upper face of this block is channeled at 230 (Fig. 5) to form a guideway for the base 232 of an end tack holding and driving unit 234. Below and within the edges of the recess 230, the face of the block 224 is provided with an elongated recess 236 housing a coiled spring 238, the front end of which engages a stud 240 depending from the base 232, and normally tends to move the base with its tack holding and driving mechanism forwardly or toward the shoe.

The base 232 is formed with an elongated slot 242 therein (Figs. 3 and 7) and a pin 244 depending from a bracket arm 246 (Figs. 2 and 3) rigidly secured to the machine frame, co-operates with this slot to limit the cam actuated forward movement of the unit 234 bodily with the block 224 determinately to position the tacks beyond the inner edges of the wipers when the wipers are partially withdrawn rearwardly for the tack driving operation. The coiled spring 238 permits the base 232 to yield backwardly relatively to the block 224 when the upstanding marginal portions of the upper offer substantial resistance to forward movement in the first or "breaking down" movement of the wipers.

The block 224 has its forward end reduced in width and thickness and bifurcated to provide spaced legs 248, (Figs. 5 and 7) through which a tack block 324, secured to the base 232 extends. From a point adjacent to the bifurcated end of the block rearwardly, the sides of the block 224 are formed as racks 252, arranged to operate the wiper mechanism through intermediate connecting devices.

The wiper mechanism includes complemental curved plates 254 having their rear ends formed with rearwardly extending arcuate enlargements 256 having arcuate grooves and tongues, the plates being pivoted together at the inner edge of their rear ends and said grooves and tongues being formed on arcs having the pivot point of the plates as a center. To the under side of the legs 248 of the block 224 a plate 260 is secured, this plate extending forwardly and having a tongue and groove correspondingly curved to receive the ar-

cuate grooves, and tongues of the wiper plates, and to support and guide the rear ends of the wiper plates.

The inner edges of the curved wiper plates conform substantially to the general contour of the heel end of a shoe. The rear end of the wiper or wipers formed by these plates is moved forwardly and over the heel of the shoe through cam actuated movement of the block 224 to wipe down that portion of the upstanding margin of the upper. The outer free ends of the wiper plates are moved inwardly toward the sides of the counter and of the bottom of the shoe and last to wipe down the side and corner marginal portions of the upper by mechanism operated through the racked sides 252 of the block 224 and best seen in Fig. 3 of the drawings.

At each side of the wiper at the outer end of its plates, a sliding plate 264 is mounted in the frame of the machine for sliding movement toward and from the shoe and last. As best seen in Figs. 1 and 3, each plate 264 at its outer end projects beyond the machine frame and is formed with an enlargement in which a spindle 266 is journaled, the spindle extending through the plate and its inner end being provided with a pinion 268. Fixed to the outer end of the spindle is a hand lever 270 carrying a suitable spring-pressed pawl (Fig. 1) co-operating with a segmental ratchet 265 extending from and rigid with the end of the plate 264. This lever, pawl and ratchet mechanism may be of any suitable construction and is intended to provide means for adjusting the plate 264 toward or from the sides of the shoe and last.

In one form which this adjustment and the wiper operating means may take, complemental bell crank levers 272 are provided at opposite sides of the forward end of the block 224, the inner end of each lever having an arcuate rack to engage a rack face 252 on the side of the block 224, and the outer end of each lever having an arcuate rack engaging a pinion 274 having a spindle journaled in the machine frame and co-operating with the racked edge of a slide 276 (Fig. 3) whose outer end is formed with a rack face 278 engaged by the pinion 268.

Adjustably mounted upon the top faces of the plates 264 at opposite sides of the machine are the base plates 280 of side tack holding and driving units 282. Links 284 (Fig. 3) are pivotally connected to the under faces of the sliding plates 264 and to the outer free ends of the wipers 254. When the block 224 is moved forwardly through the cam 228, the double racked bell cranks 272 will rotate the pinions 274 to move the slides 276 inwardly toward the shoe and, since the pinions 268 are locked against movement by the hand levers and ratchets the sliding plates 264 will be locked to the slides 276 and will be moved inwardly with them, causing, through the links 284, the free ends and corners of the wiper plates 254 to move inwardly and over the upstanding edge of the upper, thereby wiping the upper down over the sides and corners of the heel seat, while at the same time the forward movement of the block 224 will move the rear ends of the wiper plates forwardly over the end of the upstanding upper and will break and wipe it down over the heel seat of the shoe. Obviously, upon reverse movement of the block 224, the reverse action will take place. The adjustment of the base plates 280 on the sliding plates 264 which are directly connected to the wipers, positions the tacks a predetermined distance inwardly of the inner edges of the wipers at the sides of the heel seat, the parts being held in adjusted relation by clamp screws extending through slots in the plates 280 (Fig. 3).

The hand levers 270 with their co-operating ratchets 265 provide means for independently adjusting the outer ends of the wiper plates 254 when the machine is at rest and when the slides 276 are locked by their connected gearing against movement. When the hand levers are moved, the teeth of the pinions 268 will successively fulcrum against the teeth of the racks 278 and will move the sliding plates 264 with the attached side tack holding and driving units inwardly toward the shoe and will, at the same time, through the links 284, move the wiper plates inwardly toward the shoe. Such an adjustment is necessary for affective wiping action on shoes of different sizes and lasts. The location of the adjusting handles 270 on the outside of the head 6 at the front of the machine frame (see Fig. 1) enables this adjustment readily to be effected by the operator. The described adjustment is additionally advantageous in that it permits independent adjustment of the wiper ends to take care of the different contours and swing of different heel seats.

The tack holding and driving unit 234 constitutes the end unit; the tack holding and driving units 282 at the ends of the wiper plates form the side units; and what may be termed "corner" units 288 co-operate with the wiper plates between the end unit and the side units. These corner units 288 (see Figs. 3 and 12) are provided with flanged bases 286, seating in suitable guideways formed in the machine frame and extending obliquely to the wiper plates. Each of these units has a longitudinal bore in the outer end of its base plate to receive a coiled spring 290 whose outer end extends into a

socket formed in a tensioning screw 292 seating in the side of the machine frame (Fig. 3). The springs 290 operate against the corner units to move them inwardly to engage the wiper plates and to move them inwardly with the wiper plates when they swing in during the wiping operations.

Each base 286 carries on its under face in the plane of the edges of the wiper plates, an adjustable stop plate 294 having an inclined inner edge to engage the outer edge of its wiper plate and to limit the position of tacks held in said unit to a determinate maximum distance inwardly of the inner edges of the wiper plates. This adjustment is made in assembling the machine. The tack positions may be varied within this maximum by varying the extent to which the springs 290 may move the units 288 inwardly toward and with the wiper plates.

Accordingly, the base plates 286 have rods 296 extending therefrom in the direction of their length out and through smooth bores in the sides of the machine frame. The ends of these rods are threaded and receive stop nuts 298 which engage the frame and adjustably limit the inward movement of the bases 286 and their tack holding and driving units. By adjusting the stop nuts 298 which, as seen in Figs. 1 and 3, are located on the outer sides of the frame, the tacks in said units may be positioned less than the maximum distance inwardly of the wiper edges predetermined by the initial adjustment of the stop plates 294. It will also be evident that the stop nuts prevent the corner tackers from moving too far inwardly, where they might engage the holddown, in the first two advancing movements of the wipers.

Except for the described and illustrated differences in their bases and supports and in the number of tacks held by the units, the body structure of each unit is the same. As to body structure, the end unit 234 may be described as typifying this construction.

Each unit has a column upstanding from its base plate provided at its upper end with an obliquely inclined cylindrical neck 300, the inner faces of the columns being undercut to offset the lower ends of the necks, and the necks having laterally and inwardly projecting offsets at their lower ends bored vertically to form tack channels 301 as best seen in Fig. 7. The necks have bores extending longitudinally therethrough to receive plungers 302 terminating at their upper ends in spherical knobs 304 seating in movable sockets in a hammer head 306 (Figs. 1 and 2) which is guided for vertical movement by a rod 308 upstanding from the head 208 of the frame.

A series of cushioned blocks 310 are adjustably carried by the head 208 and are arranged in the same horizontal plane to engage the base of the hammer head preferably at three triangulated points and limit downward movement of the head and plungers. The mounting for the upper ends of the plungers provides ball and socket joints which enable the plungers to move freely relatively to the head when their units are moved during the wiping operations or are independently adjusted.

A lever 312 has its forward end bifurcated and pivotally connected to the head 306 (Figs. 1 and 2) and its rear end supported by an upstanding link 314 whose lower end is mounted in the machine frame. Intermediate of its ends, the under face of the lever is recessed to receive the upper end of an arm 316 (Fig. 2) which is pivoted to the lever at this point and whose lower end bears upon the periphery of a cam 318 mounted on the forward end of shaft 24. The lower end of the arm 316 is held against the cam 318 by coiled springs 320 (Fig. 1) encircling links 322 depending from opposite sides of the arm and guiding through offsets on the machine frame against which the upper ends of the springs abut, their lower ends acting against abutment nuts on the lower ends of the links. The cam 318 is figured progressively to lift the arm 316 and the head 306, compressing the springs 320, the high point of the cam being reached just prior to the time for driving the tacks, the cam at this point having a sudden drop permitting the compressed springs 320 to snap the head 306 with the plungers 302 downwardly to drive the tacks.

If the shoe being lasted is formed of unusually heavy stock necessitating a double wiping cycle properly to wipe down the edges, or, if for any other reason it is desired to repeat the wiping operation before tacking, the downward tack-driving thrust of the head 306 at the end of the cycle may be prevented and the operator may immediately restart the machine for a second cycle of operations. The arm 316, substantially in line with the lower face of lever 312, is formed with complemental shoulders 317 (Fig. 2) on its opposite side faces. A bifurcated block 311, positioned beneath the lever 312 is arranged to be manually moved during the cycle to embrace the bar 316 with its upper face below the shoulders 317 so that the bar 316, when permitted by the cam 318, will be held against effective downward tack driving movement under the impulse of the compressed springs 320. The block may be moved into such position by a hand wheel 313 (Fig. 2) located on the outside of the head 6 and having a spindle journaled in the head and connected by a link 315 with the rear end of the block 311. The upper end of the link, when the block is moved forwardly to lock the driving head 306, will be positioned to engage lugs on the

revolving tack hopper 54 to prevent a second oscillation of the hopper to feed a second set of tacks to the tack holding and driving units, and to co-operate with the hopper and its operating mechanism in the manner described in my prior Patent No. 1,129,882 of March 2, 1915. It need only be stated here that a wedge member carried by the hopper operates automatically to retract the block 311 at the proper time during the repeated wiping cycle to permit tack driving movement of the head.

Secured to and depending from the lower ends of the plungers 302 are gangs of driver rods 322 (see Figs. 7 and 12) arranged to engage the heads of tacks to drive them into the edge of the upper after it has been wiped over the heel seat. To the base of each of the tack holding and driving units (in the case of the side and corner units, that portion of the unit projecting beyond the inner edge of the base plate) is secured a tack block 324 (Figs. 3, 7 and 12) having its forward end projecting beyond the adjacent inner edge of a wiper plate and having its upper portion provided with a number of tack receiving bores of a diameter to permit the tacks to fall therethrough and also to permit the driving rods 322 freely to be plunged therethrough.

Rearwardly of these bores, the upper face of the tack block is formed with a stop shoulder 326. The under face of the tack block from its front edge rearwardly, is recessed to receive a sectional tack receiving and holding base comprising a grid having front and back walls 328, 330 and one or more connecting ribs 332, depending upon the number of tacks to be received. As shown in Fig. 3, the end unit 234 is designed to receive two tacks, and the corner and side units three tacks. Where two tacks are to be supported and driven, a single rib 332 (Fig. 8) will be employed and where three tacks are to be supported, two spaced parallel ribs will be used (see Fig. 3).

The inner faces of the front walls 328 will be cupped out to form one half of an inverted substantially conical pocket, the apex of which is located at the bottom of the holder. These recesses will conform in number to the number of tacks to be supported and are located at opposite sides of the single rib structure and between and at the outer sides of the ribs of the double rib structure as shown in the side unit 282 at the left hand side in Fig. 3.

The rear walls 330 will act as abutments for the rear ends of coiled springs whose front ends are inserted in sockets in movable blocks 329 co-operating with the front wall and having shoulders formed on their upper faces to engage stop shoulders on the under faces of the blocks 324, (Figs. 7, 8 and 12). These movable blocks will have their front faces recessed to correspond with the recesses in the front wall 328 to complete the conical tack receiving pocket. Obviously, when the drivers 322 are plunged downwardly, the front walls 328 will move forwardly and the blocks 329 backwardly to the thrust of the driving rods 322 to permit the tacks to be forced from the pockets and into the wiped over edge of the shoe upper. The described parts are retained upon the tack block in assembled relation by means of a closure plate 334 (Figs. 7 and 12) having appropriately located side walls to enclose the movable blocks and their springs and having recessed front edges to permit the tacks to be driven therethrough.

These tacks are supplied to the several units by the tack feeding and delivering mechanism previously referred to through a series of flexible wire tubes 336 extending from said tack feeding and delivering mechanism to the various units. Accordingly, the offset portions of these units are provided with two or three bores 301, as the case may be, extending vertically therethrough and counterbored at their upper ends to provide a diameter sufficient to receive the ends of the flexible tubes 336.

Below the bores 301 bored conductor plates 338 are mounted, their upper ends being pivoted to the offsets with their bores in the line of the corresponding tack bores in the offsets. The lower ends of these plates are normally positioned over and in alinement with the bores in the forward ends of the tack blocks 324 and each against the stop shoulder 326 by means of a coiled spring interposed between the offset and the upper end of the swinging conductor plate. These conductor plates are, obviously, each provided with two or more bores forming tack channels extending longitudinally of the plate and registering at their upper and lower ends with the bores 301 and the bores in the front ends of the tack blocks 324.

The conductor plates, at points in substantial alinement with the lower ends of the plungers 302 in their fully raised positions, are provided with lateral offsets 340 and the lower ends of the plungers are beveled so that when they are thrust downwardly, their lower beveled ends will engage the offsets 340 and will swing the lower ends of the conductor plates away from the tack bores in the tack blocks, permitting the driver rods 322 to be thrust downwardly through the tack blocks to engage the supported tacks and drive them from the conical pockets in the sectional base into the wiped over edge of the upper positioned below it.

The hold-down 200, best seen in Fig. 11, has its base channeled out to provide spaced

contact or bearing faces 342, preferably three in number and triangulated to provide a contact ensuring a firm uniform bearing against the sole.

The machine is adapted to last the upper over the heel seat of turn shoes as well as McKay and welt shoes. In the manufacture of turn shoes, this operation occurs during the second lasting operation, the upper having been lasted to the sole from the shank to the toe during the first lasting operation. A shank piece *s* is applied to the last, and the upper at the heel end of the shoe is lasted and tacked to this shank piece by the second lasting operation, the term "insole" being frequently used herein as inclusive of such a shank piece. In order to effect this result the heel end of the sole must be held away from the lasting devices. In my machine, I have provided a hold back blade 344 adjustably secured to and depending from the head 208 to engage and hold back the heel portion of the sole in the manner suggested in Fig. 9 of the drawings. It will be evident that as the jack is swung rearwardly to carry the shoe into the heel band the member 344 will act to turn back the heel end of the sole which may be initially turned up by the operator.

It will be noted that the lasting head overhangs, and is laterally offset from, the base carrying the work support and is in determinate angular relation to the base; and that it supports lasting instrumentalities, the operation of which transmits strain to the lasting head and to the base through the work support, which strain tends to spring said head and base out of this determinate angular relation. Means are employed for rigidly connecting the base and overhanging head and strengthening them against relative divergence through strain. As shown in Fig. 1, a brace or tie rod rigidly connects the base and the overhanging head.

The entire normal cycle of operations takes place in continuous sequence during one revolution of the driven shaft 24, one treadling only being necessary to operate the machine through a complete cycle, the shaft 24 being stopped automatically at the end of a single revolution.

The operation of the described mechanism in lasting and tacking the heel seat is as follows: The parts in the position of rest, are as shown in Figs. 1 and 2 with the rolls engaging the cams of cam wheel 116 as shown in the plot of the cam paths in Fig. 10. In these positions, the hold-down 200 is in its highest position; the wipers and tack holding and driving units are drawn back, and the clamping band is in its fully opened position. The operator mounts the last, with its attached upper and insole on the last pin of the jack or standard 148 and may, if necessary, adjust the toe rest 158 properly to elevate the toe end of the last. The standard is then swung backwardly as far as it may be conveniently by hand and the treadle 202 is depressed to bring the insole against the hold-down 200 as illustrated in Fig. 9. The elevation of the contact face of the hold-down is such that the upper face of the insole will be in a plane above the plane of the lower faces of the wiper plates. If a turn shoe is to have its heel seat lasted the heel portion of the sole is lifted to engage with and be turned and held back by the blade 344 as indicated in Fig. 9. If necessary because of the shape of the heel end of the shoe, the heel band may be adjusted through the hand lever 90 (Fig. 1) and pinion 88, which in co-operation with the stop 244 will determine the distance of the rear tacks from the edge of the heel seat, and the wipers and side tack holding and driving units may be adjusted through the hand levers 270 as previously described. The stop nut on the rod 222 may also be adjusted, if necessary, to change the amount of lowering and lifting movement of the hold-down and to vary its initial position. The last and upper are now positioned to be operated upon by the machine.

Accordingly, the treadle 52 is depressed, throwing in the clutch and starting the revolution of the cam shaft 24.

At the beginning of the revolution of shaft 24 (as will be seen most clearly from the cam plots in Fig. 10) the cam wheel 116 will first bring the rise in the cam surface 172 against the roll 171 of lever 170 to start the preliminary backward power movement of the standard and last previously described to bring the rear end face of the shoe substantially against the band before the band begins to close. After the completion of this movement, the cam surface 172 holds the lever 170 and its operating parts in the same position until the end of the cycle when the low part of the cam surface causes the lever and its ratchet-operating arm 166 to return to initial position under the influence of a suitable spring.

At a point during this movement of the rise in the cam surface 172 against roll 171, the first rise in the cam surface 118 will operate against roll 121 to swing the bell crank lever 120 in a direction to move the racked plate 130 rearwardly, closing, through the previously described connections, the heel band to clamp and conform the upper tightly about the heel end of the last and substantially coincidently, through bell crank lever 180 and its described operating connections swinging backwardly the jack standard and holding the last and shoe upper locked back against the heel clamping band, with the extremity of the shoe upper hard pressed against the clamping band, the heel clamping and jack

positioning movement terminating subsequently to the end of the preliminary yieldingly effected backward movement of the jack and before the first or breaking down movement of the wiper plates 254. Since the hold-down is being moved downwardly, in a manner to be described, to upwipe the upper, cam operated movement of rod 190 to lift the jack standard is lost motion taken up by compression of the spring 191.

As the cam surface 118 operates through roll 121 and its bell crank lever to clamp the end of the shoe about the last, a rise in cam surface 174 operates against roll 221 and lever 220 to move the hold-down 200 downwardly, forcing, in turn, the heel end of the shoe and last downward relatively to the heel gripping band 60 which presses against the moving shoe and acts to upwipe the shoe upper over the sides of the last closely to conform the upper to the sides of the last in a manner similar to the upwiping action of the toe wiper plates on "bed" lasting machines when the toe head with the wipers moves upwardly relatively to the toe end of the shoe. This downward movement of the last and shoe is effected without injury to the jack lifting connections since the spring 191 is compressed and takes the strain off these parts. Very substantial upwiping pressure is secured since the jack and shoe are locked back against the band under relatively heavy pressure.

This downward movement of the shoe and last is figured to end with the bottom of the heel end of the shoe position slightly below the plane of the bottom faces of the heel wiper plates 254 so that the shoe is positioned for the first or "breaking down" movement of the wipers, which follows.

The first inward and forward movement or "breaking down wipe" of the wiper plates occurs at the end of the clamping and upwiping operations referred to, when cam wheel 116 brings the first outward bend in the peripheral cam groove against the roll 226 of the sliding wiper actuating block 224, moving the block forwardly to move the wipers with their co-operating tack holding and driving units inwardly and forwardly as previously described, and reversing the movement to retract the wipers and tack holding and driving units as the continued rotation of the cam wheel 116 brings the adjacent reverse bend in the groove against roll 226, the engagement of the terminal of this reverse bend with roll 226 withdrawing the wipers to their initial position of inactivity. This first wiping movement "breaks down" the upstanding marginal portions of the upper over the heel seat but does not iron them out flat, since the last is not as yet moved up sufficiently to bring the heel seat substantially in the plane of the lower faces of the wipers.

Accordingly, as the roll 226 reaches the terminal of the reverse bend in the cam groove 228 which withdraws fully the wipers, the jack and last, through bell crank lever 120 and its described connections operated upon by a second rise on the cam 118, are further pulled backwardly and upwardly, the spring 191 being now compressed to a point of substantial rigidity as the jack is lifted to position the face of the shoe insole substantially in the plane of the lower faces of the wiper plates, the clamping band rising upwardly with the shoe and last. Substantially coincidently, the operation of the racked slide 130 and its connections more tightly clamps the heel band about the shoe further compressing and conforming the upper to the last.

Coincidently, with the engagement of the roll 121 by the second rise on cam surface 118 further to lift the jack and last, the hold-down controlling roll 221 encounters a drop in the cam surface 174 permitting the rack bar 216 to lift the hold-down coincidently with and proportionately to the second lifting movement of the jack and last. In the event of slight variance between the amount of lifting movements of the hold-down and jack the spring 191 will prevent any straining or breaking of parts. These described heel band clamping, jack swinging and lifting, and hold-down lifting movements occur in the order stated, as the roll 226 reaches the described position at the end of the first "wipe" and is just entering the forwardly inclined portion of a second bend in the cam groove 228 to give a second wiping reciprocation to the sliding block 224.

As the cam wheel 116 continues to rotate the roll 226 and sliding block 224 will be similarly reciprocated a second time for a second "wipe" over the now "broken down" marginal edges of the upper but with the last and shoe now raised to bring the top face of the insole substantially in the plane of the bottom faces of the wipers so that the marginal portions will be "ironed down" flat over the edges of the insole with the upper tightly conformed to the side faces of the last.

A third bend in the cam groove 228 operates against the roll 226 to effect a final though only partial inward and forward wiping movement of the plates, the plates resting in this position for a short period to permit the lasting tacks to be driven while the wiped over edges are held down by the plates with the previously compacted, and iron inner portions of the edges exposed to receive the tacks. The tacks will always be driven at points located definite distances from the inner edges of the wipers since the pin 244 definitely positions the tacks of the end unit, and the corner and side tack holding and driving units position their tacks as

predetermined by the described adjustments for the respective units.

The cam 318 has its high point and drop located to effect maximum compression of the spring 320 and immediately to release it to snap down the hammer head 306 to drive the tacks when the wiper plates have been moved inwardly and forwardly to their third wiping position, and just prior to their retraction from that position at the end of the cycle. The continued rotation of shaft 24 now operates to move the head 306 upwardly sufficiently to position the driving rods 322 substantially above the tack blocks 324 (see Fig. 7) and completely to withdraw the wiper plates, at which point the cam surface 34 automatically operates to throw out the clutch and stop rotation of the driven shaft 24.

The cam groove 30 is formed to effect a complete reciprocation of the frame 31 (which, as described in my prior Patent No. 1,129,882, operates to feed the requisite number of tacks to the tack holding and driving units) at the beginning of the cycle so that the tacks are fed to and seated in the bottom of the driving bores of the respective tack blocks in ample time before the head 306 is operated to drive the tacks. The driving bores and tack driving rods are inclined at an angle so that when driven, the tacks take up or reduce any slack that may exist between the tacking points and those portions of the edges compacted and held down by the wiper plates.

Toward the end of the revolution of cam wheel 116, just before the wipers are finally retracted and the tack driving rods raised to permit the next set of tacks to be fed, cam surface 118 brings its lowest point in contact with roll 121 of bell crank lever 120, causing the heel band to release the shoe and last and rendering the bell crank lever 180 effective to return the ratchet operating arms 184 and 192 to initial position so that the heel band is loosening and the jack is lowering as the wipers start to move to fully retracted position, the lever 170 also returning with the other parts. As a result, the pressure against the wiper plates is relieved and the wipers are retracted without any "drag" outwardly on the lasted edges. As the pawls 186 and 198 and the pawl which engages the ratchet wheel 164 are returned to their initial positions, they are engaged by suitable throw-out members to disconnect them from their ratchet wheels, as will be understood by reference to Fig. 7. The jack standard may now be swung forwardly by hand and the shoe and last removed. Coincidently with the release of the jack standard by the operation of cam 118, the cam surface 174 brings its lowest portion against the roll 221 further to cause the hold-down to return to its initial position.

The machine is now ready to operate upon another last and upper after they have been mounted upon the jack, and the jack moved to position the heel end of the last and upper within the heel band and against the hold-down.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A machine of the class described having, in combination, means to support a last, means to hold an upper on the last in close conformity to the sides of the last at one end, wiper mechanism including complemental wiper plates curved to embrace said end of the last and mounted for bodily and relative swinging movement, with intergeared adjusting members arranged for manual operation relatively and independently to swing said plates to conform the contour defined by their edges substantially to that of the end to be lasted, and power operated means constructed and arranged to effect subsequent bodily and relative swinging movement of the wiper plates over the bottom of the last to wipe down the upstanding edges of the upper over the bottom of the last.

2. A machine of the class described having, in combination, means to support a last, means to hold an upper in close conformity to one end of the last, and mechanism operative to wipe down the marginal portions of the upper over the bottom of the last at said end of the last, said mechanism including two pivotally mounted curved wiper plates with gear operated adjusting connections to the outer swinging end of each plate arranged for operation independently to swing said plates to conform the contour defined by their edges substantially to the contour of said end of the last and mechanism arranged subsequently to move said wiper plates inwardly and forwardly and outwardly and backwardly to wipe down and compact the marginal portions of the upper over the bottom of the last.

3. A machine of the class described having, in combination, pivoted wiper plates arranged to operate upon one end of a shoe, a last and shoe support arranged to be moved to position the last and shoe in cooperative relation to the wiper plates, means arranged to engage and hold a shoe upper in close conformity to the sides of the last at one end of the last when the latter is operatively positioned, with manually operable intergeared adjusting members co-operating with the outer swinging ends of the wiper plates determinately and independently to swing and hold said ends of said

wiper plates in initially adjusted position, and mechanism operative to effect subsequent bodily and swinging movement of the wiper plates to wipe down the marginal portions of the upper over the bottom of the last at said end of the last.

4. A machine of the class described, having, in combination, pivoted wiper plates arranged to operate upon one end of a shoe, a last and shoe support arranged to be moved to position the last and shoe in co-operative relation to the wiper plates, means arranged to engage and hold a shoe upper in close conformity to the sides of the last at one end of the last when the latter is operatively positioned, rack and pinion operated adjustment means co-operating with the outer swinging ends of the wiper plates determinately and independently to swing and hold said ends of said wiper plates in initially adjusted position, mechanism operative subsequently to effect bodily and swinging movement of the wiper plates to wipe down the marginal portions of the upper over the bottom of the last at said end of the last, and mechanism operative to tack down said wiped-over marginal portions.

5. A heel seat lasting mechanism having, in combination, pivoted wiper plates arranged to operate upon the heel end of a shoe, a last and shoe support arranged to be moved to position a last and shoe in co-operative relation to the wiper plates, means arranged to engage and hold the shoe upper in close conformity to the heel end of the last when the last and shoe are operatively positioned relatively to the wiper plates, an adjusting member connected to the outer swinging end of each wiper plate, manually operable rack and pinion gearing co-operating with said adjusting members and arranged determinately and independently to swing said outer ends of the wiper plates to an initially adjusted position to adjust the contour defined by their edges to conform substantially to the contour of the heel end of the last, and mechanism operative to effect bodily and swinging movement of the wiper plates to wipe the marginal portions of the upper over the bottom of the last at the heel seat.

6. A machine of the class described having, in combination, end lasting wiper plates for closing over a last bottom, manually operable means determinately to adjust the positions of the wiper plates to initially position the wiper plates to act on the marginal portions at the end of a shoe upper mounted on the last, means to effect bodily and swinging movement of the wiper plates to wipe said marginal portions over the bottom of the last into position to be fastened on the bottom of the last, and tacking units co-operating with the wiper plates and having means to maintain them in predetermined relation to the wiper plates in all positions of adjustment of said plates.

7. A machine of the class described having, in combination, end lasting wiper plates for closing over a last bottom at one end, manually operable means determinately and independently to adjust the positions of the wiper plates initially to position said plates to act on the marginal portions at the end of a shoe upper mounted on the last, means to effect bodily and swinging movement of the wiper plates to wipe said marginal portions over the bottom of the last into position to be fastened, and tacking units co-operating with and having means to maintain them in predetermined relation to the wiper plates in all positions of adjustment of said plates, including side tacking units having positive unyielding connections with the free ends of said plates.

8. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to operate said plates to wipe over and compact the upper on the last bottom at said end, tacking units yieldingly held in predetermined position relatively to the end and corners of the wiper element, and side tacking units having positive unyielding connection to the sides of the wiper element at the free ends of said wiper plates.

9. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to operate said plates to wipe over and compact the upper on the last bottom at said end, end and corner tacking units yieldingly held in predetermined position relatively to the end, corners of the wiper element and side tacking units having positive unyielding connection with the sides of the wiper element at the free ends of said wiper plates, and means to adjust the positions of the free ends of the wiper plates and coincidently and correspondingly to adjust the position of the side tacking units.

10. A heel seat lasting machine having, in combination, a wiper element comprising wiper plates for closing over the heel end of a last bottom, means to operate said plates to wipe over and compact the upper on the last bottom at the heel seat, end and corner tacking units yieldingly held in predetermined position relatively to the heel end and corners of the wiper element, and side tacking units having positive unyielding connection to the sides of the wiper element at the forward ends of said wiper plates.

11. A heel seat lasting machine having, in combination, a wiper element comprising wiper plates for closing over the heel end of a last bottom, means to operate said plates to wipe over and compact the upper on the

last bottom at the heel seat, tacking units yieldingly held in predetermined position relatively to the heel end and corners of the wiper element, side tacking units having positive unyielding connection to the sides of the wiper element at the forward ends of said wiper plates, and means coincidently to adjust the positions of the side tacking units and the forward ends of the wiper plates.

12. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to effect bodily and swinging movement of the plates of said element to wipe over the upper upon the last bottom at said end of the last, tacking units co-operating with the end, corners and sides of said wiper element and positioned in predetermined relation to said wiper element for tacking, with means to vary the effective tacking positions of said corner and side units relatively to the wiper element.

13. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to effect bodily and swinging movement of the plates of said element to wipe over the upper upon the last bottom at said end of the last, tacking units co-operating with the end, corners and sides of said wiper element and positioned in predetermined relation to said wiper element for tacking, with means independently to vary the effective tacking positions of said corner and side tacking units relatively to the wiper element.

14. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to effect bodily and swinging movement of the plates of said element to wipe over the upper upon the last bottom at said end of the last, tacking units co-operating with the end, corners and sides of said wiper element and positioned in predetermined relation to said wiper element for tacking, with means located on the outside of the machine and accessible to the operator for varying the effective tacking positions of said corner and side tacking units relatively to the wiper element.

15. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to effect bodily and swinging movement of the plates of said element to wipe down the upper over the last bottom at said end of the last, tacking units co-operating with the end, corners and sides of said wiper element and positioned in predetermined relation to said wiper element for tacking, with means located on the outside of the machine and accessible to the operator independently to vary the effective tacking positions of said corner and side tacking units relatively to the wiper element.

16. A machine of the class described having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at one end, means to effect bodily and swinging movement of the plates of said element to wipe over the upper upon the last bottom at said end of the last, tacking units co-operating with the end, corners and sides of said wiper element having tack holding means and driving instrumentalities to drive tacks in the wiped over upper, with means to position said units with their tack-holding means located predetermined distances inwardly from the inner edges of the wiper plates, and means determinately to vary the positions of the tack holding means of said corner and side units relatively to the wiper plates.

17. A heel seat lasting machine having, in combination, a wiper element comprising end lasting wiper plates for closing over a last bottom at the heel end thereof, means to effect bodily and swinging movements of said wiper plates inwardly and outwardly over the last bottom to wipe the upper over the last bottom at the heel seat, tacking units co-operating with the end, corners, and sides of said wiper element having tack holding means and driving instrumentalities to drive tacks in the wiped over upper, with means to position said units with their tack-holding means located predetermined distances inwardly from the inner edges of the wiper plates, and means determinately to vary the positions of the tack holding means of said corner and side units relatively to the wiper plates.

18. A machine of the class described having, in combination, means to support a last, means to hold an upper on the last in close conformity to the last at one end, and mechanism operative to wipe the marginal portions of the upper over the bottom of the last at said end comprising pivoted end wiper plates having extensions, a supporting member for the wiper plates bodily movable with said plates and having means arranged to receive and guide said wiper plate extensions for swinging movement, and operating connections between said member and said pivoted plates effective to swing said plates upon movement of said member bodily to move said plates.

19. A machine of the class described having, in combination, means to support a last, means to hold an upper on the last in close conformity to the last at one end, and mechanism operative to wipe the marginal portions of the upper over the bottom of the last

at said end comprising pivoted end wiper plates having extensions at their pivoted ends, an operating member arranged to effect bodily and swinging movement of said plates having a support for the extensions of said plates, arcuate tongue and groove guiding and supporting connections between said plate extensions and said support, and operating connections between said member and said plates effective to swing said plates upon movement of said operating member bodily to move said plates.

20. A heel seat lasting machine having, in combination, means to support a last, means to hold an upper on the last in close conformity to the last at the heel end of the last, and mechanism operative to wipe the marginal portions of the upper over the bottom of the last at the heel seat comprising curved wiper plates pivotally interconnected at the inner edges of their rear ends and having rearward extensions from said pivoted ends, an operating member mounted for sliding movement to effect bodily movement of said wiper plates and having a wiper support, with arcuate tongue and groove connections between the plate extensions and said support, and positive connections between the sliding operating member and the free ends of said wiper plates to swing said plates inwardly and outwardly upon forward and backward movement of the operating member.

21. A lasting mechanism of the class described, having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a movable adjusting member connected to the closed or rear end of said clamping member, supporting means for the edges of said clamping member adjacent to its open end, pressure members arranged to engage and press inwardly the sides of said U-shaped clamping member, manually operable means to move said adjusting member bodily to slide said clamping member relatively to said pressure members, means to operate said pressure members, and end wiping mechanism to wipe down the edges of the upper over the bottom of the last.

22. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a movable adjusting member connected to the rear or closed end of the U-shaped clamping member, pressure members supported at opposite sides of the clamping member and arranged to engage and press inwardly the sides of the U-shaped clamping member, supports for the opposite side edges of the clamping member mounted to move with said pressure members, manual means for operating said adjusting member to move said clamping member relatively to said pressure members and said supports, means to operate said pressure members, and end wiping mechanism to wipe down the edges of the upper over the bottom of the last.

23. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a movable adjusting member connected to the lower edge of said clamping member at its rear closed end, means to support the lower edges of said clamping member at opposite sides, pressure members arranged to engage the opposite sides of the U-shaped clamping member at points above its lower edges and to press said sides inwardly to force the end of the upper in close conformity to the last, manually operable means to move said adjusting member to slide the U-shaped clamping member relatively to said pressure members, means to operate said pressure members to clamp the shoe upper, and end wiping mechanism to wipe down the edges of the upper over the bottom of the last.

24. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a movable adjusting member having connection with the clamping member adjacent to its lower edge and having a fixed back stop to engage the clamping member intermediate of its upper and lower edges, means to support opposite sides of the clamping member at its lower edges, pressure members arranged to engage and press inwardly the sides of the U-shaped clamping member to conform the upper to the last, manually operable means to move said adjusting member to slide the clamping member relatively to said pressure members and said supports, means to operate said pressure members, and end wiping mechanism to wipe the edges of the upper over the bottom of the last.

25. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a movable adjusting member having connection with the clamping member adjacent to its lower edge and having a fixed back stop to engage the clamping member intermediate of its upper and lower edges

and having means yieldingly to engage the rear end of the clamping member adjacent to its upper edge and at opposite sides of its longitudinal median line, pressure members arranged to engage and press the sides of the clamping member to conform the upper to the last, manually operable means to move said adjusting member bodily, and end wiping mechanism to wipe the edges of the upper over the bottom of the last.

26. A lasting mechanism of the class described having, in combination, an integral, substantially U-shaped band of flexible material to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping band, a movable adjusting member having connection with the lower edge of the clamping band at its rear closed end and having a rigid back stop to engage the clamping band intermediate of its upper and lower edges at said rear end, supports for the lower edges of said band at its opposite sides, pressure members arranged to engage and press inwardly the sides of the band, manually operable means to move said adjusting member to slide the clamping band relatively to said supports and pressure members, means to operate said pressure members to clamp and conform the shoe upper to the end of the last, and end wiping mechanism to wipe the edges of the upper over the bottom of the last.

27. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping band to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said band, a movable adjusting member connected to the rear closed end of the band, means to support the edges of the band at opposite sides and forwardly of its rear closed end, manually operable means determinately to move said adjusting member to move the clamping band, abutments positioned to engage the opposite sides of the band and effective, upon such bodily movement, to control the band and determine its contour, means to press the sides of the band inwardly to cause the band to clamp and conform the upper to the end of the last, and end wiping mechanism to wipe the edges of the upper over the bottom of the last.

28. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping band to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping band, means to support the edges of the clamping band at opposite sides thereof and forwardly of its closed rear end, a movable adjusting member connected to said band at its rear end, manually operable means determinately to move said adjusting member to move the clamping band relatively to said supporting means, pressure members having contact faces positioned to engage the opposite sides of the band and effective upon such bodily movement of the band to control the band and determine its contour, means to operate said pressure members to press the band inwardly to clamp and conform the shoe upper to the end of the last, and end wiping mechanism to wipe down the edges of the upper over the bottom of the last.

29. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a support for the rear closed end of the clamping member, means to exert pressure against the sides of the U-shaped clamping member to clamp and conform the upper to the end of the last, means positively to lock the pressure exerting means against accidental unclamping movement, and wipers to operate upon the edges of the clamped upper to wipe said edges over the bottom of the last.

30. A lasting mechanism of the class described having, in combination, a substantially U-shaped flexible clamping member to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, a support for the rear closed end of the clamping member, means to exert pressure against the sides of the U-shaped clamping member to clamp and conform the upper to the end of the last, means constructed and arranged to lock the pressure exerting means against accidental retraction from upper clamping position and automatically to release the locking means upon predetermined unclamping movement of said pressure exerting means, and wiper mechanism to operate upon the edges of the clamped upper to wipe said edges over the bottom of the last.

31. A lasting machine of the class described having, in combination, a substantially U-shaped flexible clamping member arranged to embrace one end of a last and shoe upper, means to support a last and shoe upper with one end positioned within said clamping member, contact plates arranged to engage opposite side faces of the clamping member, springs cooperating with said plates, pressure means operable to tension said springs against said plates to move the clamping member to clamp and conform the shoe upper to one end of the last, with means operative automatically to lock said plates against pressure releasing movement, and end wiping mechanism operable to wipe

he edges of the clamped upper over the bot-
om of the last.

32. A lasting machine of the class de-
cribed having, in combination, a substan-
ially U-shaped flexible clamping member
rranged to embrace one end of a last and
hoe upper, means to support a last and
hoe upper with one end positioned within
aid clamping member, contact plates ar-
anged to engage opposite side faces of the
lamping member, springs cooperating with
aid plates, pressure means operable to ten-
ion said springs against said plates to move
he clamping member to clamp and conform
he shoe upper to one end of the last, with
eans operative automatically to lock said
lates against pressure releasing movement
nd operative automatically to release the
lates upon operation of said pressure means
o release the clamping member, and end
iping mechanism operable to wipe the
dges of the clamped upper over the bottom
f the last.

33. A lasting machine of the class de-
cribed having, in combination, a substan-
ially U-shaped flexible clamping band ar-
anged to embrace one end of a last and
hoe upper, means to support a last and
hoe upper with one end positioned within
aid clamping band, pressure members at
pposite sides of said band having contact
lates thereon to engage opposite side faces
f the band to clamp and conform the upper
o the last and mounted automatically to
onform to the vertical contour of the sides
f a last, means to actuate said pressure
embers to clamp and conform the shoe
pper to the last, means operative automat-
cally to lock said pressure members against
ressure releasing movement independently
f said actuating means, and end wiping
echanism to wipe the edges of the
lamped upper over the bottom of the last.

34. A machine of the class described hav-
ng, in combination, end wiper plates con-
tructed and arranged to wipe the sides,
orners and end of the marginal edge of one
nd of a shoe upper over the bottom of a
ast at one end of the last, means to hold a
ast and shoe upper in co-operative relation
o the wiper plates, means to effect bodily
nd swinging movement of the wiper plates
ver the bottom of the last to wipe the up-
tanding edges of the upper over the bottom
f the last, side tacking units determinately
ositioned relatively to the wiper plates and
aving positive connection with said wiper
lates adjacent to their free ends, and cor-
er and end tacking units yieldingly main-
ained in determinate relation to the wiper
lates and normally moving therewith but
rranged to yield under pressure from con-
ct with the upstanding marginal edge of
n upper.

35. A machine of the class described hav-
ing, in combination, end wiper plates con-
structed and arranged to wipe the sides, cor-
ners, and end of the marginal portion of one
end of a shoe upper over the bottom of a
last at one end of the last, means to hold a
last and shoe upper in co-operative relation
to the wiper-plates, means to effect bodily
and swinging movement of the wiper plates
over the bottom of the last to wipe the up-
standing edges of the upper, over the bot-
tom of the last, side tacking units determin-
ately positioned relatively to and extending
beyond the inner edges of the wiper plates
and having positive connection with said
wiper plates adjacent to their free ends,
corner and end tacking units yieldingly
maintained in determinate relation to the
wiper plates to extend beyond the inner
edges of the plates and normally moving
therewith but arranged to yield under pres-
sure from contact with the upstanding mar-
ginal edge of an upper, means to feed tacks
to said units, and means to drive said tacks
into the wiped over edges of the upper.

36. A machine of the class described hav-
ing, in combination, clamping means to en-
gage and conform one end of a shoe upper
to its last, a support for a last and shoe ar-
ranged for movement to co-operate with
said clamping means, wipers arranged to
operate upon the marginal edges of the up-
per at said end of the shoe and last, power
operated mechanism determinately to move
said support relatively to the wipers and
clamping means to position the last and shoe
to co-operate with said clamping means and
wipers and to operate said clamping means
to clamp and hold the shoe and last, and
mechanism operative in timed relation to
said support and clamping means to actuate
the wipers to break down the upstanding
edges of the upper, said power operated
mechanism being subsequently operative fur-
ther to move said support with its last and
shoe relatively to the wipers and rigidly to
support and hold the last and shoe, and said
wiper mechanism being subsequently op-
erative in timed relation further to actuate
the wipers to wipe down and compact the
broken down edges of the upper over the
bottom of the last.

37. A heel seat lasting mechanism for
boots and shoes having, in combination, a
last and shoe support, a band arranged to
embrace the heel end of a shoe, power op-
erated mechanism determinately to move
said support to position the heel end of the
last and shoe within said band and to clamp
the band about said heel end of the shoe
and last, and wiper mechanism operative in
timed relation to said support and band to
break down the edge of the upper at the
band-embraced end of the clamped shoe,
said power operated mechanism being sub-
sequently operative in timed relation fur-

ther to move the last and shoe support relatively to the wipers and rigidly to support and hold the last and shoe and said wiper mechanism being subsequently operative in timed relation to wipe and compact the broken down edge of the upper over the heel seat of the shoe.

38. A machine of the class described having, in combination, clamping means to engage and conform one end of a shoe upper to its last, a hold-down arranged for vertical movement and positioned to be engaged with the bottom of the last and shoe, a support for a last and shoe arranged for manually effected vertical and horizontal movement to position the last and shoe against said clamping means and hold-down, wipers arranged to operate upon the marginal edges of the upper at said end of the shoe and last, power operated mechanism to move said support to press an end of the shoe and last against said clamping means and hold-down and to operate said clamping means to clamp and conform the upper to the last, mechanism operable to move said hold-down determinately to depress the last and shoe relatively to said clamping means, said power operated mechanism being subsequently effective in timed relation to said support and clamping means to actuate the wipers to break down the edge of the clamped upper over the bottom of the last, and means operative subsequently in timed relation determinately to raise said hold-down relatively to the last and shoe and to the wipers, said power operated mechanism being operative substantially coincidently to raise said support with its last and shoe relatively to the wipers to engage the bottom of the last and shoe with said hold-down with the bottom of the shoe in-sole substantially in the operating plane of the wipers, and said wiper mechanism being subsequently operative in timed relation further to actuate the wipers to wipe over and compact the broken down edges of the upper over the bottom of the last and shoe.

39. An end lasting mechanism for boots and shoes having, in combination, an end embracing band supported for bodily movement upwardly, a hold-down arranged for vertical movement and positioned to engage over the bottom of a last and shoe, a last and shoe support manually movable to engage the shoe with said hold-down and band, power operated mechanism to move said support to force the shoe and last against said band and hold-down and operative to clamp the band about said end of the shoe and last, mechanism operative to depress said hold-down to force downwardly the support and clamped last and shoe relatively to the clamping band, and wiper mechanism operative in timed relation to said support and band to break down the edge of the upper over the bottom of the last at t band-embraced end of the depressed a clamped shoe, said hold-down mechanis being subsequently operative in timed rel tion determinately to raise the hold-dow relatively to said wiper mechanism, and sa power operated mechanism being operati substantially coincidently to raise the su port with the last, shoe and clamping ban to engage the bottom of the last and sho with said hold-down and said wiper mech nism being subsequently operative in time relation to wipe over and compact th broken down edge of the upper over the bo tom of the last.

40. A heel seat lasting machine having, i combination, clamping means to embrace th heel end of a last and shoe, a hold-dow mounted for vertical movement and pos tioned to be engaged by the bottom of th last and shoe, a support for a last and sho constructed and arranged for manually e fected movement to engage the shoe wit said clamping means and hold-down, mech nism to actuate the clamping means to e gage the embraced end of the shoe and las means operative automatically to effect rel tive upwiping movement between the la and shoe and said clamping means, en wiper mechanism operative in timed rel tion to said upwiping movement to brea down the edge of the upper at the clampe end of the positioned shoe, and means aut matically operated in timed relation an subsequently effective determinately to rais the hold-down relatively to said wiper mech anism and correspondingly to raise said sup port with its last and shoe to engage th bottom of the last and shoe with said hold down, said wiper mechanism being subse quently operative in timed relation to wip over and compact the broken down edge o the upper over the heel seat of the shoe.

41. A machine of the class described hav ing, in combination, clamping means to em brace one end of a last and shoe, end wipers positioned to operate on the edges of the upper at said end of the shoe, a hold-down mounted for vertical movement and posi tioned to engage the bottom of the last and shoe, a support for a last and shoe con structed and arranged for manually effected movement to engage the last and shoe with said clamping means and hold-down, power operated mechanism having a resilient lift ing connection with said support and effec tive to move said support forcibly to press the last and shoe against said clamping means and hold-down and to actuate the clamping means, mechanism effective in timed relation to the clamping means to depress the hold-down and support to po sition the shoe bottom determinately below the plane of the wipers, and mechanism op erative to actuate the wipers to break down

the edge of the upper over the bottom of the positioned last and shoe, the said hold-down mechanism being automatically operative subsequently determinately to raise the hold-down, the said power operated mechanism being operative substantially coincidently correspondingly to raise said support to engage the bottom of the last and shoe with said hold-down with the shoe bottom positioned substantially in the plane of the wipers, and the end wiper mechanism being subsequently operative in timed relation to wipe over and compact the broken down edge of the upper over the bottom of the last.

42. A machine of the class described having, in combination, clamping means to embrace one end of a last and shoe, end wipers positioned to operate on the edges of the upper at said end of the shoe, a hold-down mounted for vertical movement and positioned to engage the bottom of the last and shoe, a support for a last and shoe constructed and arranged for manually effected movement to engage the last and shoe with said clamping means and hold-down, power-operated mechanism effective to move said support forcibly to press the last and shoe against said clamping means and hold-down and to actuate the clamping means, mechanism effective in timed relation to the clamping means to depress the hold-down and support to position the shoe bottom determinately below the plane of the wipers, mechanism operative to actuate the wipers to break down the edge of the upper over the bottom of the positioned last and shoe, the said hold-down mechanism being automatically operative subsequently determinately to raise the hold-down, the said power operated mechanism being operative substantially coincidently correspondingly to raise the said support to engage the bottom of the last and shoe with said hold-down with the shoe bottom positioned substantially in the plane of the wipers, and the end wiper mechanism being subsequently operative in timed relation to wipe over and compact the broken down edge of the upper over the bottom of the last and shoe, and manually adjustable means for determinately varying the amount of vertical movement of the hold-down.

43. A machine for lasting the heel seats of boots and shoes comprising, in combination, wiper plates arranged to wipe down and compact the upstanding edges of a shoe upper over the heel seat, means for supporting and holding a last and shoe upper in position to co-operate with said wiper plates, and a depending hold-back member terminating at a point above the plane of the bottom of the last and shoe in operative lasting position and positioned forwardly of the rear end of the heel seat to engage and hold the heel portion of the sole of a turn shoe back from the heel seat.

44. A machine for lasting the heel seats of shoes comprising in combination, wiper plates arranged to wipe down and compact the upstanding edges of a shoe upper over the heel seat, means for supporting and holding a last and shoe upper in position to co-operate with said wiper plates, and a plate supported above the plane of the bottom of the shoe and last in operative lasting position and having its end positioned forwardly of the rear end of the heel seat to engage and hold back the heel end of the sole of a turn shoe.

45. A machine of the class described having, in combination, means for supporting a last and shoe upper, end embracing wipers, and automatically operated mechanism constructed and arranged to work the entire end portion of the upper into lasted position under pressure serving to compact the overworked upper upon the last bottom and thereafter to release the pressure and subsequently to withdraw the wipers, all in a normal uninterrupted series of operations initiated by a single actuation of a power controlling means.

46. A machine of the class described having, in combination, means for supporting a last and shoe upper, end embracing wipers, tacking mechanism, and automatically operated mechanism constructed and arranged to work the entire end portion of the upper into lasted position under pressure serving to compact the overworked upper upon the last bottom, thereafter partially to retract the wipers and to tack down exposed portions of the overworked upper, subsequently to release the pressure and thereafter completely to withdraw the wipers, all in the normal uninterrupted series of operations initiated by a single actuation of a power controlling means, said mechanism including manually operable means to prevent the opreation of the tacking mechanism during said cycle without interference with the continuity of the cycle.

47. A machine of the class described having, in combination, clamping means to embrace one end of a shoe, wipers to operate upon the edge of the upper at said end of the shoe, a support for a last and shoe with means to move said support to position one end of the last and shoe for co-operation with the clamping means and in determinate relation to the wipers, operating means to cause the clamping means to embrace said end of the shoe to conform it to the sides of the last, means to effect determinate relative movement between said shoe support and said clamping means to upwipe and conform the sides of the shoe upper to the sides of the last and to position the shoe for co-operation with the wipers, and means

to operate the wipers to wipe the edges of the shoe upper over the bottom of the last.

48. A machine of the class described having, in combination, clamping means to embrace one end of a shoe, wipers to operate upon the edge of the upper at said end of the shoe, a support for a last and shoe with means to move said support to position one end of the last and shoe for co-operation with the clamping means and in determinate relation to the wipers, operating means to cause the clamping means to embrace said end of the shoe to conform it to the sides of the last, mechanism operative determinately to move said support with its last and shoe relatively to said clamping means to upwipe and conform the sides of the shoe upper to the sides of the last and to position the shoe for co-operation with the wipers, and means to operate the wipers to wipe the edges of the shoe upper over the bottom of the last.

49. A machine of the class described having, in combination, clamping means to embrace one end of a shoe, wipers to operate upon the edges of the shoe upper at the clamped end of the shoe, a support for a last and shoe with means to raise said support to position the last and shoe for cooperation with the clamping means and in determinate relation to the wipers, means to operate the clamping means to embrace the end of the positioned shoe to conform the sides of the upper to the sides of the last, mechanism operative determinately to depress said support with its last and shoe relatively to the clamping means to upwipe and conform the upper over the sides of the last and to position the shoe in a plane to co-operate with the wipers, and means to operate the wipers to wipe the edges of the upper over the bottom of the last.

50. A machine of the class described having, in combination, clamping means to embrace one end of a shoe, wipers to operate upon the edges of the shoe upper at the clamped end of the shoe, a support for a last and shoe with means to raise said support to position the last and shoe for co-operation with the clamping means and in determinate relation to the wipers, means to operate the clamping means to embrace the end of the positioned shoe to conform the sides of the upper to the sides of the last, mechanism operative determinately to depress said support with its last and shoe relatively to the clamping means to upwipe and conform the upper over the sides of the last and to position the shoe with its bottom in a plane determinately below the plane of the wipers, means to operate the wipers to break down the upstanding edge of the upper over the bottom of the last, means to raise the shoe support to position the shoe with its bottom substantially in the operating plane of the wipers, and means to operate the wipers to wipe down and compact the previously broken down edge of the upper over the bottom of the last.

51. In an end lasting mechanism, an end embracing band, wipers, a last and shoe support, means to move the support to position one end of the shoe for engagement by the band with the shoe bottom in a plane out of the plane of effective action of the wipers, means to operate the band to clamp the shoe upper to the last, and means relatively to move the shoe and clamping band to upwipe the upper over the last and to position the shoe with the edges of its upper in the plane of effective action of the wipers.

52. In an end lasting mechanism, an end embracing band, wipers, a last and shoe support, means to raise the support to position one end of the shoe for engagement by said band with the shoe bottom in a plane above the plane of effective action of the wipers, means to operate the band to clamp the shoe upper to the last, and means determinately to depress the shoe relatively to the band to upwipe the shoe upper over the sides of the last and to position the shoe with the upstanding edge of its upper in the plane of effective wiping action of said wipers.

53. A heel seat lasting machine having, in combination, clamping means to embrace the heel end of a shoe upper, wipers to operate upon the edge of the upper at the heel end of the shoe, a support for a last and shoe, means to move said support to position the heel end of the last and shoe for co-operation with the clamping means and in determinate relation to the wipers, operating means effective to cause the clamping means to embrace the heel end of the positioned shoe to conform the shoe upper to the sides of the last, means to effect determinate relative movement between said shoe support and clamping means to upwipe the upper over the last and to position the shoe for co-operation with the wipers, and means to operate the wipers to wipe the edges of the upper over the heel seat of the shoe.

54. A heel seat lasting machine having, in combination, clamping means to embrace the heel end of a shoe, wipers to operate upon the upstanding edges of the upper at the clamped end of the shoe, means to support a last and shoe in inverted position, means to raise said support to position the last and shoe for co-operation with the clamping means with the bottom of the shoe above the operating plane of the wipers, means to operate the clamping means to embrace the heel end of the positioned shoe, mechanism operative determinately to depress said last and shoe support relatively to the clamping means to upwipe the upper

over the sides of the last and to position the shoe with the upstanding edges of its upper in a plane to co-operate with the wipers, and means to operate said wipers to wipe down the upstanding edges of the upper over the heel seat of the shoe.

55. A heel seat lasting machine having, in combination, clamping means to embrace the heel end of a shoe, wipers to operate upon the upstanding edges of the upper at the clamped end of the shoe, means to support a last and shoe in inverted position, means to raise said support to position the last and shoe for co-operation with the clamping means with the bottom of the shoe above the operating plane of the wipers, means to operate the clamping means to embrace the heel end of the positioned shoe, mechanism operative determinately to depress said last and shoe support relatively to the clamping means to upwipe the upper over the sides of the last and to position the shoe with its bottom in a plane determinately below the operating plane of the wipers with the upper edges in said operating plane, and means subsequently to operate said wipers in timed relation to the shoe support to break down the upstanding edges of the upper over the heel seat, said support operating mechanism being subsequently effective in timed relation determinately to raise said support and shoe to position the shoe bottom in the operating plane of the wipers, and said wiper operating means being subsequently effective in timed relation to operate the wipers to wipe down and compact over the heel seat the broken down edges of the upper.

56. A machine of the class described having, in combination, means to support a last, means to hold an upper on the last against the sides of the last at one end, wiper mechanism including end embracing wipers mounted for relative swinging movement, and power operating means and connections to said wipers for effecting swinging movement of the wipers to wipe down the upper materials over the bottom of the last, said power operated connections including means detachably and adjustably connecting the wiper plates and the power operating means and manually operable to swing said wipers independently of said power means to conform the contour defined by the edges of said wipers approximately to the contour of the end of the last to be operated upon.

57. A machine of the class described having, in combination, means to support a last, means to hold an upper on the last against the sides of the last at one end, wiper mechanism including end embracing wipers mounted for relative swinging movement, and power operated connections to said wipers for effecting swinging movement of the wipers to wipe down the upper materials over the bottom of the last, said power operated connections including power operated members movable bodily toward and from the opposite sides of a supported last and having adjustable connection with the outer swinging ends of the wipers, said members being manually operable to swing said wipers independently of the power means to adjust said wipers previous to power operation to conform the contour defined by the wiper edges approximately to the contour of the end of the last to be operated upon.

58. A machine of the class described having, in combination, means to support a last, means to hold an upper on the last against the sides of the last at one end, wiper mechanism including end embracing wipers mounted for bodily and swinging movement toward and over the bottom of the last, power operated mechanism to effect bodily and relative swinging movement of the wipers over the bottom of the last to wipe down the upper materials, and members adjustably connecting the outer swinging ends of the wipers to said power mechanism, said members being manually movable laterally of the last to swing and adjust the wipers relatively to said mechanism and toward and from the opposite sides of the last prior to power operations of the wipers to conform the contour defined by the edges of said wipers approximately to the contour of the end of the last to be operated upon.

59. In a machine of the class described, in combination, end embracing wipers mounted for swinging movement to close over the bottom of a last, means to support a last and shoe with one end in co-operative relation to said wipers, and power operated connections to said wipers for effecting swinging movement of the wipers including connections to the outer swinging ends of said wipers arranged for manually effected adjustment laterally of the shoe to swing said wipers to an initially adjusted position independently of and previous to power operation with the contour defined by their edges conforming substantially to the contour of the end of the last and shoe to be operated upon.

60. In a machine of the class described, the combination of a last support, means arranged to embrace a boot or shoe upper on a supported last at one end of the last to clamp and conform the upper materials to said end of the last, means to operate said end embracing means, and means relatively to move the last support and end embracing means into contact at the extreme end of the last under relatively heavy upper conforming pressure and unyieldingly to hold said parts in contact under pressure during upper-conforming operation of the end embracing means.

61. In a machine of the class described,

the combination of a last support, means arranged to embrace a boot or shoe upper on a supported last at one end of the last to clamp and conform the upper materials to said end of the last, mechanism to close said end embracing means to clamp and conform the upper materials, and means automatically operative in timed relation to the closing of the end embracing means to move the last and upper on the last support into said embracing means with the upper at the extreme end of the last exerting substantial pressure against said end embracing means and to lock the support positively in such position to maintain said pressure during the upper-conforming operation of the end embracing means.

62. In a machine of the class described, the combination of a last support, means arranged to embrace a boot or shoe upper on a supported last at one end of the last to clamp and conform the upper materials to said end of the last, mechanism to operate said end embracing means to clamp and conform the upper materials, and means automatically operative in timed relation to the closing of the end embracing means relatively to move the last support and end embracing means to hold the upper at the extreme end of the last with relatively heavy upper-conforming pressure against said embracing means and to lock said parts positively in such conforming position to maintain said pressure during the upper conforming operation of the end embracing means and subsequently and automatically to release said parts from such locked conforming position.

63. In a machine of the class described, the combination of means for conforming a shoe upper to the side of its last at one end of the last, a last support mounted for swinging movement, and power means to swing said support in a direction to move the last with its upper lengthwise into lasting position with the upper at the extreme end of the last hard pressed against said conforming means, and for unyieldingly holding said swinging support with the shoe pressed back in said position.

64. In a machine of the class described, the combination of means for conforming a shoe upper to the side of its last at one end of the last, a pivoted last support with power means to swing said support to move the last and shoe upper lengthwise into lasting position with the extremity of the upper hard pressed against said conforming means and to lock said swinging support in such position, power operated means for further and relatively moving the last and conforming means to force the shoe upper harder against said conforming means.

65. A machine of the class described having, in combination, clamping means to embrace the end of a shoe upper, a last and shoe support mounted for movement toward and from said clamping means, power means to move said support to force the extremity of the shoe upper hard against said clamping means and to lock the shoe in such position, means for operating the clamping means tightly to embrace the end of the shoe, and mechanism for relatively moving the support and shoe and said clamping means in a direction transverse to the plane of the shoe bottom with the shoe pressed hard against said clamping means to cause said clamping means to upwipe the shoe upper.

66. A machine of the class described having, in combination, clamping means to embrace the end of a shoe upper, a last and shoe support mounted for lateral movement toward and from said clamping means and for bodily movement in a direction transverse to the plane of the shoe bottom, power means for laterally moving said support to force the extremity of the shoe upper hard against said clamping means and for locking the support and shoe in such position, mechanism for operating the clamping means tightly to embrace the end of the shoe upper, and mechanism for moving the support with its last and shoe upper in a direction transverse to the plane of the shoe bottom with the extremity of the shoe held pressed against said clamping means to cause said clamping means to upwipe the embraced end of the shoe upper.

67. A machine of the class described having, in combination, clamping means to embrace the heel end of a shoe upper, a support for a last and shoe mounted for lateral movement toward and from said clamping means and for movement relatively to said clamping means in a direction transverse to the plane of the shoe bottom, mechanism for moving said support laterally to press the heel end of a shoe upper on a supported last hard against said clamping means and including means for locking said support in such position, mechanism for operating the clamping means tightly to embrace the heel end of the shoe upper to conform it to its last, and means for moving the support relatively to said clamping means in said transverse direction, with the heel end of the shoe held hard against said clamping means to cause said clamping means to upwipe the embraced heel end of the shoe upper.

68. In a machine of the class described, in combination, a support for a last and shoe, power operated means to engage and clamp the upper to the sides of the heel end of its last, means for relatively moving the shoe support and said clamping means substantially perpendicularly to the plane of the shoe bottom to cause said clamping means to wipe the shoe stock toward the bottom face of the last, and additional means for

laying the margin of the upper inwardly over the bottom of the last.

69. In a machine of the class described, in combination, a support for a last and shoe, means to engage and clamp the upper at one end of the shoe against its last by relative movement of the shoe and said clamping means lengthwise of the shoe, means for moving the last and shoe support relatively to said clamping means and substantially perpendicularly to the plane of the shoe bottom in time relation to the upper clamping operation to cause said clamping means to wipe the shoe stock toward the bottom face of the last, and additional means for laying the margin of the upper inwardly over the bottom of the last.

70. In a machine of the class described, in combination, a support for a last and shoe, means to engage and clamp the upper round one end of its last, means for flanging the marginal portion of the stock, and means for relatively moving in time relation the shoe support and said clamping means lengthwise of the shoe to clamp the upper and substantially perpendicularly to the plane of the shoe bottom to cause said clamping means to wipe the shoe stock toward the bottom face of the last to prepare the marginal portion of the stock for the flange-forming operation.

71. In a machine of the class described, in combination, a support for a last and shoe, a band arranged to embrace one end of the shoe upper, power operated means for moving said band from an open to a closed position to press the upper against the last, means for flanging the marginal portion of the upper and laying it over the edge of the last bottom, and power operated means for moving the shoe support relatively to the closed band and in a direction to cause said band to wipe the shoe stock toward the bottom of the shoe to prepare the marginal portion of the stock for the flange-forming operation.

72. In an end lasting machine, power operated mechanism including means operated in timed relation to embrace and clamp the end portion of a shoe and relatively to move the last and the clamped shoe stock to draw the shoe stock toward the bottom face of the last, and means then to wipe the margin of the shoe stock over the bottom face of the last.

73. In a heel seat lasting machine, power operated mechanism including means operated in timed relation to embrace and clamp the heel end of a shoe upper against the sides of its last, relatively to move the last and the clamped shoe stock to draw the shoe stock toward the heel seat face of the last, and then to wipe the margin of the shoe stock inwardly over the heel seat face of the last.

74. In a heel seat lasting machine, the combination with means to clamp the shoe stock about the sides of the rear portion of a last and means to wipe the margin of the shoe stock in over the heel seat face of the last, of means for causing the clamping means automatically to tighten the clamped shoe stock about the sides in a direction toward the heel seat face of the last preparatory to the margin wiping action.

75. In a heel seat lasting machine, the combination with flange forming wipers, of mechanism organized to prepare the shoe stock automatically for the action of the wipers by clamping it to the contour of the sides of the heel part of the last and tightening it over the sides toward the heel seat face of the last.

76. In a lasting machine, a base, a shoe support connected to said base, an overhanging lasting head connected to and laterally offset from said base in determinate and angular relation thereto and supporting lasting instrumentalities operative to transmit to said lasting head and to said base through the shoe support during the lasting operation strain tending to spring said base and head out of determinate angular relation, and bracing means rigidly connecting and strengthening said parts against relative divergence through strain.

77. In a lasting machine, a base, a shoe support connnected to said base, an overhanging lasting head connected to and laterally offset from said base in determinate angular relation thereto and supporting lasting instrumentalities operative to transmit to said lasting head and to said base through the shoe support during the lasting operation strain tending to spring said base and head out of determinate angular relation, and a tie rod rigidly connected to said head and base to strengthen said parts against relative divergence through strain.

78. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, power means for imparting an operative movement of predetermined extent to said wipers including parts relatively movable manually to adjust the wipers preliminarily in substantial conformity to the contour of the shoe, and additional means for locking said parts in adjusted relation.

79. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, operating means for said wipers including parts movable manually to effect a preliminary adjustment of the wipers to the contour of the shoe while other portions of said operating means are stationary, and pawl and ratchet mechanism for locking said movable parts in adjusted position

80. In a machine of the class described,

the combination with last and shoe positioning means, of end embracing wipers, manual means for swinging said wipers initially inward to adjust them approximately to the contour of the shoe, means for locking said wipers against reverse outward movement, and additional power operated means for subsequently advancing and closing the wipers over the shoe.

81. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, and operating means for said wipers including slides movable laterally of the shoe while other portions of said operating means are stationary to effect a preliminary adjustment of the wipers to the contour of the shoe.

82. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, operating means for said wipers including members movable relatively to other portions of said means to effect a preliminary adjustment of the wipers, means for imparting adjusting movement to said members, and means automatically operative in said movement of the members to lock them in adjusted position.

83. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, and power operating means for imparting to each of said wipers independently of the other a positive operative movement of predetermined extent, said operating means including parts relatively movable manually to effect a preliminary adjustment of each wiper independently of the other prior to the operation of said means.

84. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, operating means for said wipers including parts movable to effect a preliminary adjustment of the wipers to the contour of the shoe while other portions of said operating means are stationary, and tackers movable inwardly over the shoe and connected to said wipers for preliminary adjustment with them.

85. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, means for effecting a preliminary adjustment of the wipers to the contour of the shoe, additional power means for subsequently operating the wipers, and tackers connected to the wipers for preliminary adjustment with them and for power effected movement with the wipers subsequently over the shoe.

86. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, operating means for said wipers including parts movable laterally of the shoe while other portions of said operating means are stationary to effect a preliminary adjustment of the wipers inwardly toward the sides of the shoe, and side tackers positively connected to said wipers to maintain them in the same relation to the wipers in all positions of wiper adjustment.

87. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, means for operating said wipers, a tacker movable inwardly over the shoe bottom under the control of said wipers, spring means for moving said tacker inwardly, and means for limiting the inward movement of the tacker independently of the movement of the wipers.

88. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, means for operating said wipers, tackers movable inwardly over the shoe bottom under the control of said wipers in different directions substantially radial to the curve of the edge of the bottom face of the shoe, spring means for moving said tackers inwardly, and means for adjustably limiting the inward movement of said tackers independently of the movement of the wipers.

89. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, means for operating said wipers, end and corner tackers movable inwardly over the shoe bottom in different directions substantially radial to the curve of the edge of the bottom face of the shoe, means to cause said tackers to move inwardly with the wipers, and means for limiting the movement of the tackers independently of the wipers.

90. In a machine of the class described, the combination with last and shoe positioning means, of end embracing wipers, means for operating said wipers, end and corner tackers movable inwardly over the shoe bottom with said wipers in different directions substantially radial to the curve of the edge of the bottom face of the shoe for driving tacks beyond the inner edges of the wipers, and means arranged to permit said tackers to yield along the plane of the wipers in response to resistance of the shoe materials and subsequently to move them inward into predetermined relation to the wipers when such resistance is removed.

91. In a machine of the class described, the combination with last and shoe positioning means, of an end embracing band for clamping the upper round the lateral periphery of an end of the last, supporting means relatively to which the opposite side portions of the band are permitted to slide lengthwise of the shoe, and means connected

to the end portion of the band for adjusting it lengthwise of the shoe and relatively to said supporting means.

92. In a machine of the class described, the combination with last and shoe positioning means, of an end embracing band, means connected to the end portion of said band to move it adjustably in directions lengthwise of the shoe, and connections to the opposite side portions of the band arranged for engagement with it to determine its contour as it is adjusted lengthwise of the shoe.

93. In a machine of the class described, the combination with end lasting wipers, of an end embracing band, shoe positioning means, and mechanism for operating said shoe positioning means to move the shoe relatively to said band to cause the band to wipe the upper in a direction transverse to the plane of the shoe bottom and for subsequently moving the shoe in the opposite direction to position it relatively to the wipers, said band being mounted for movement with the shoe in said last named positioning movement of the shoe.

94. In a machine of the class described, means for clamping the upper of a shoe at the opposite sides of an end portion of its last, means for moving said clamping means laterally of the shoe to clamping position, and additional means for locking said clamping means against reverse outward movement.

95. In a machine of the class described, an end embracing band, means for moving the opposite side portions of said band inwardly toward a shoe to clamping position, and additional means automatically operative in said inward movement of the sides of the band to lock them against reverse outward movement.

96. In a machine of the class described, an end embracing band, means for moving the opposite side portions of said band inwardly toward a shoe to clamping position, and pawl and ratchet mechanism automatically operative in the inward movement of sides of the band to lock them against reverse outward movement.

97. In a machine of the class described, an end embracing band, operating means for moving the opposite side portions of said band inwardly into clamping relation to a shoe, additional means for locking the sides of the band in clamping position, and mechanism to cause said operating means in its reverse outward movement to operate said locking means to release the band.

98. In a machine of the class described, the combination with an end embracing band, of a shoe support, and operating means for moving said shoe support yieldingly to force the shoe into the band and for then imparting a further positive movement in the same direction to the support to seat the shoe more firmly in the band and for holding it against reverse movement.

99. In a machine of the class described, the combination with an end embracing band, of a shoe support, power operated means for moving said shoe support yieldingly to force the shoe into the band, and additional power operated means for subsequently imparting a further positive movement to the shoe support in the same direction to seat the shoe more firmly in the band.

100. In a machine of the class described, the combination with an end embracing band, of a shoe support, means for operating said shoe support yieldingly to force the shoe into the band, and additional means for imparting a further positive movement to the shoe support in the same direction and for simultaneously closing the band about the end of the shoe.

101. In a machine of the class described, the combination with end lasting wipers, of a shoe support, means for imparting a plurality of successive inward wiping movements to said wipers, and means for operating on said shoe support yieldingly to position the shoe for the first action of the wipers and for holding the support substantially rigid for the subsequent action of the wipers.

102. In a machine of the class described, the combination with end lasting wipers and means for operating them repeatedly, of an end embracing band, a shoe support, and means for relatively moving the shoe support and the band to clamp the shoe and for sustaining the shoe yieldingly against pressure on its bottom face in the first closing movement of the wipers and for holding it substantially rigid against pressure on said face and seating it more firmly in the band for the subsequent action of the wipers.

103. In a machine of the class described, the combination with end lasting wipers, of a shoe support, means for imparting successive operative movements to said wipers, and means for operating on said shoe support to sustain the shoe yiedingly against pressure on its bottom face for the first action of the wipers and to move it toward the plane of the wipers and hold it substantially rigid against pressure on said face for the subsequent action of the wipers.

104. In a machine of the class described, the combination with heel lasting mechanism, of means for positioning a turn shoe for the action of said mechanism including a device to hold the heel end portion of the sole of the shoe turned back from the heel seat face of the last.

105. In a machine of the class described, the combination with heel lasting mecha-

nism, of means for positioning a turn shoe for the action of said mechanism comprising a holddown member for pressing upon the heel seat face of the last in the shoe and additional means for engaging the sole of the shoe to hold it turned back from the heel seat face of the last.

106. In a machine of the class described, the combination with turn shoe heel seat lasting mechanism, and a shoe support movable to carry a turn shoe into operative relation to said mechanism, of a device arranged to operate in such movement of the shoe to turn back the heel end of the sole out of the way of the lasting mechanism.

107. In a machine of the class described, the combination with end lasting wipers, and a holddown for engaging the bottom of the shoe, of manually operated means for jacking the shoe upwardly against said holddown, and power means automatically operative upon the starting of the machine to assume control of the shoe and position it relatively to said holddown for the action of the wipers.

108. In a machine of the class described, the combination with heel seat lasting wipers, and a holddown for engaging the heel seat of the shoe, of treadle means for jacking the shoe upwardly against said holddown before the machine is started, and power means automatically operative subsequently to sustain the shoe against the holddown and to control the shoe during the lasting operation.

109. In a machine of the class described, the combination with heel seat lasting wipers, a band for embracing the heel end of the shoe, and a holddown for engaging the heel seat face of the shoe, of a shoe support movable to carry the shoe into said band, manual means for uplifting the shoe support to engage the heel seat face of the shoe with said holddown, and power operated means for controlling the shoe support during the lasting operation.

110. In a machine of the class described, the combination with heel seat lasting wipers, a band for embracing the heel end of the shoe, and a holddown for engaging the heel seat face of the shoe, of manually operated means for carrying the shoe into said band and for upraising it against the holddown prior to the starting of the machine, and power operated means for subsequently sustaining the shoe against the holddown and for operating the holddown to depress the shoe to cause said band to wipe the upper toward the edge of the heel seat.

111. In a machine of the class described, the combination with a shoe support, heel seat lasting wipers, and a band for embracing the heel end of the shoe, of power operated means for effecting relative bodily movement of said shoe support and band, first yieldingly and then positively, to seat the shoe in the band prior to the action of the wipers on the shoe.

112. In a machine of the class described, the combination with heel seat lasting wipers, and a band for embracing the heel end of the shoe, of a shoe support movable manually to carry the shoe preliminarily into said band, and power means automatically operative upon the starting of the machine to move said shoe support to force the shoe first yieldingly and then positively into said band.

113. In a machine of the class described, the combination with heel seat lasting wipers, means for imparting to said wipers repeated overwiping movements, and a band for embracing the heel end of the shoe, of a shoe support, and operating mechanism for moving said shoe support first yieldingly and then positively to force the shoe into the band prior to the operation of the wipers and for imparting to said support a further positive movement to seat the shoe more firmly in the band between successive operations of the wipers.

114. In a machine of the class described, the combination with wipers and means for imparting to them repeated wiping movements over an end of a shoe, of a band for embracing the end of the shoe, and means for effecting between repeated movements of the wipers a positive relative movement of the band and the shoe to increase the pressure of the band on the shoe.

115. In a machine of the class described, the combination with a shoe support, and a band for embracing the heel end of the shoe, of mechanism including a cam controlled lever and a spring for moving said shoe support yieldingly to force the shoe into the band, and additional cam controlled mechanism for subsequently imparting a positive movement to the shoe support in the same direction to seat the shoe more firmly in the band.

116. In a machine of the class described, the combination with a shoe support, and a band for embracing the heel end of the shoe, of mechanism for moving said shoe support first yieldingly and then positively to force the shoe into said band, including a spring through which the yielding movement is imparted to the support, and means for varying the stress of said spring.

117. In a machine of the class described, the combination with a band for embracing the heel end of a shoe, of a shoe support movable manually to carry the shoe preliminarily into the band, power operated mechanisms for subsequently imparting to said shoe support yieldingly a further movement to force the shoe into the band, and additional power operated mechanism operative in time relation to said first mecha-

nism to impart to the shoe support a further positive movement to seat the shoe more firmly in the band.

118. In a machine of the class described, the combination with a support for a last and its shoe materials, a band for embracing the heel end of the shoe, and means for closing said band about the end of the shoe, of power yieldingly operated means for operating said shoe support to force the shoe into the band before the band begins to close about the shoe.

119. In a machine of the class described, the combination with a shoe support, a band for embracing the heel end of the shoe, and means for closing said band about the end of the shoe, of means for operating said shoe support to force the shoe yieldingly into the band while the band is in substantially open position, and additional power operated means for forcing the shoe positively into the band during the closing of the band.

120. In a machine of the class described, the combination with a shoe support, a band for embracing an end of the shoe, and means for closing said band about the end of the shoe, of operating devices for effecting respectively in time relation to the closing of the band different movements of the shoe support lengthwise of the shoe to force the shoe into the band.

121. In a machine of the class described, the combination with a band for embracing an end of a shoe, and means for closing the band about the end of the shoe, of means for effecting relative bodily movement of the band and the shoe lengthwise of the shoe, first yieldingly and then positively, in time relation to the closing of the band to press the end face of the shoe against the band.

122. In a machine of the class described, the combination with a band for embracing an end of a shoe, and means for closing the band about the end of the shoe, of power operated mechanism for effecting a yielding relative bodily movement of the shoe and the band lengthwise of the shoe to seat the shoe in the band before the band begins to close, and additional power operated mechanism for effecting a similar relative bodily movement of the shoe and the band positively during the closing of the band.

123. In a machine of the class described, the combination with a shoe support and a shoe end embracing band relatively movable to position an end of the shoe preliminarily in said band, of operating means for effecting after the shoe has been thus positioned a positive relative movement of said shoe support and band lengthwise of the shoe to seat the shoe firmly in the band.

124. In a machine of the class described, the combination with a shoe support, and a band for embracing an end of the shoe, of operating mechanism including a yielding element for effecting an indeterminate relative bodily movement of the shoe support and the band lengthwise of the shoe to seat the end face of the shoe against the band while the band is in substantially open position, and mechanism for thereafter effecting a similar relative movement of the shoe support and the band of automatically determined extent to increase the pressure of the band against the end face of the shoe.

125. In a machine of the class described, the combination with a shoe support, and a band for embracing the heel end of the shoe, of mechanism for imparting to the shoe support yieldingly a movement of indeterminate extent to force the shoe into the band while the band is in substantially open position, and mechanism for imparting to said shoe support in time relation to the closing of the band about the shoe a further movement of automatically determined extent to press the end face of the shoe more firmly against the band.

126. In a machine of the class described, the combination with a shoe support, end-embracing wipers, and a band for embracing the heel end of the shoe, of operating mechanism for effecting in time relation to each other a relative bodily movement of the shoe support and the band lengthwise of the shoe to seat the shoe in the band and a relative bodily movement of the shoe and the band heightwise of the shoe to wipe the upper toward the edge of the heel seat before the wipers complete the wiping of the upper inwardly from said edge.

127. In a machine of the class described, the combination with end lasting mechanism and a shoe support, of controlling mechanism for said shoe support automatically operative to sustain the shoe yieldingly against pressure on its bottom face during a portion of the lasting operation and to hold the shoe substantially rigid against such pressure during the remainder of the lasting operation.

128. In a machine of the class described, the combination with a shoe support, end embracing wipers, an end embracing band, and means for moving the shoe relatively to said band to upwipe the upper, of means for holding the shoe support yieldingly against pressure on the bottom face of the shoe during a portion of the lasting operation including the upwiping of the upper and for subsequently holding the support substantially rigid against such pressure on the shoe.

129. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for advancing and closing said wipers over

an end of the shoe, of side tackers positively connected to the wipers for movement inwardly over the shoe into tacking position, and end and corner tackers also movable inwardly under control of the wipers, said end and corner tackers being yieldable relatively to the wipers in response to resistance to their inward movement.

130. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for advancing and closing said wipers over an end of the shoe, of side tackers positively connected to the wipers for movement inwardly over the shoe into tacking position, additional tackers also movable inwardly under control of the wipers, spring means for imparting inward movement to said additional tackers while permitting them to yield relatively to the wipers in response to resistance to such inward movement, and devices cooperating with said spring means to determine the positions of said additional tackers for the tacking operation.

131. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for advancing and closing said wipers over an end of the shoe, of side tackers positively connected to the wipers for movement inwardly over the shoe into tacking position, end and corner tackers also movable inwardly under control of the wipers and yieldingly positioned relatively to the wipers, and means for adjusting the different tackers relatively to the wipers to vary the tacking positions.

132. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for closing said wipers over an end of the shoe, of tackers mounted for inward movement laterally of the shoe under control of said wipers, spring means against the resistance of which the tackers are yieldable relatively to the wipers while the wipers continue their inward movement, and means for limiting the inward movement of the tackers independently of the wipers and the shoe to determine the tacking positions.

133. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for closing said wipers inwardly over an end of the shoe, of end and corner tackers mounted independently of one another for forward and inward movements in converging paths into position for fastening the margin of the upper, and operating mechanism for moving said tackers and wipers inwardly together including yielding elements arranged to permit the tackers to yield relatively to the wipers while the wipers continue their inward movement.

134. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for closing said wipers inwardly over an end of the shoe, of a plurality of tackers mounted independently of each other for inward movements over the shoe in converging paths, yieldable means for moving the tackers inwardly with the wipers, and means for limiting the inward movements of the tackers independently of the wipers and the shoe.

135. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for closing said wipers inwardly over an end of the shoe, of a plurality of tackers mounted independently of each other for inward movements over the shoe in converging paths, means for moving said tackers yielding inward with the wipers, and a stop mechanism associated with each of said tackers to limit its inward movement independently of the shoe and the wipers and adjustable to vary said limit of movement.

136. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for closing said wipers inwardly over an end of the shoe, of a plurality of tackers movable inwardly over the shoe, operating means for moving said wipers and tackers inwardly together, and means for stopping the inward movements of the tackers while the wipers continue their inward movement to overwipe the margin of the upper beyond the locations where the tacks are to be driven.

137. In a machine of the class described, the combination with shoe positioning means, end embracing wipers, and means for moving said wipers inwardly different distances in different overwiping operations, of tackers movable inwardly over the bottom of the shoe, means for moving said tackers yieldingly inward with the wipers, and limiting means for stopping the inward movements of the tackers before the wipers arrive at the limit of their greater movement over the shoe.

In testimony whereof I have signed my name to this specification.

RONALD F. McFEELY.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,558,737, granted October 27, 1925, upon the application of Ronald F. McFeely, of Beverly, Massachusetts, for an improvement in "Lasting Machines," errors appear in the printed specification requiring correction as follows: Page 11, line 36, for the word "position" read *positioned*, and line 124, for the word "iron" read *ironed;* page 13, claim 9, strike out present line 106 and insert instead *to the end and corners of the wiper element,;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of December, A. D. 1925.

[SEAL.]

WM. A. KINNAN,
Acting Commissioner of Patents.

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Sept. 16, 1924. 1,508,394

C. H. HOYT

FASTENING INSERTING MACHINE

Filed Jan. 28, 1920 4 Sheets-Sheet 1

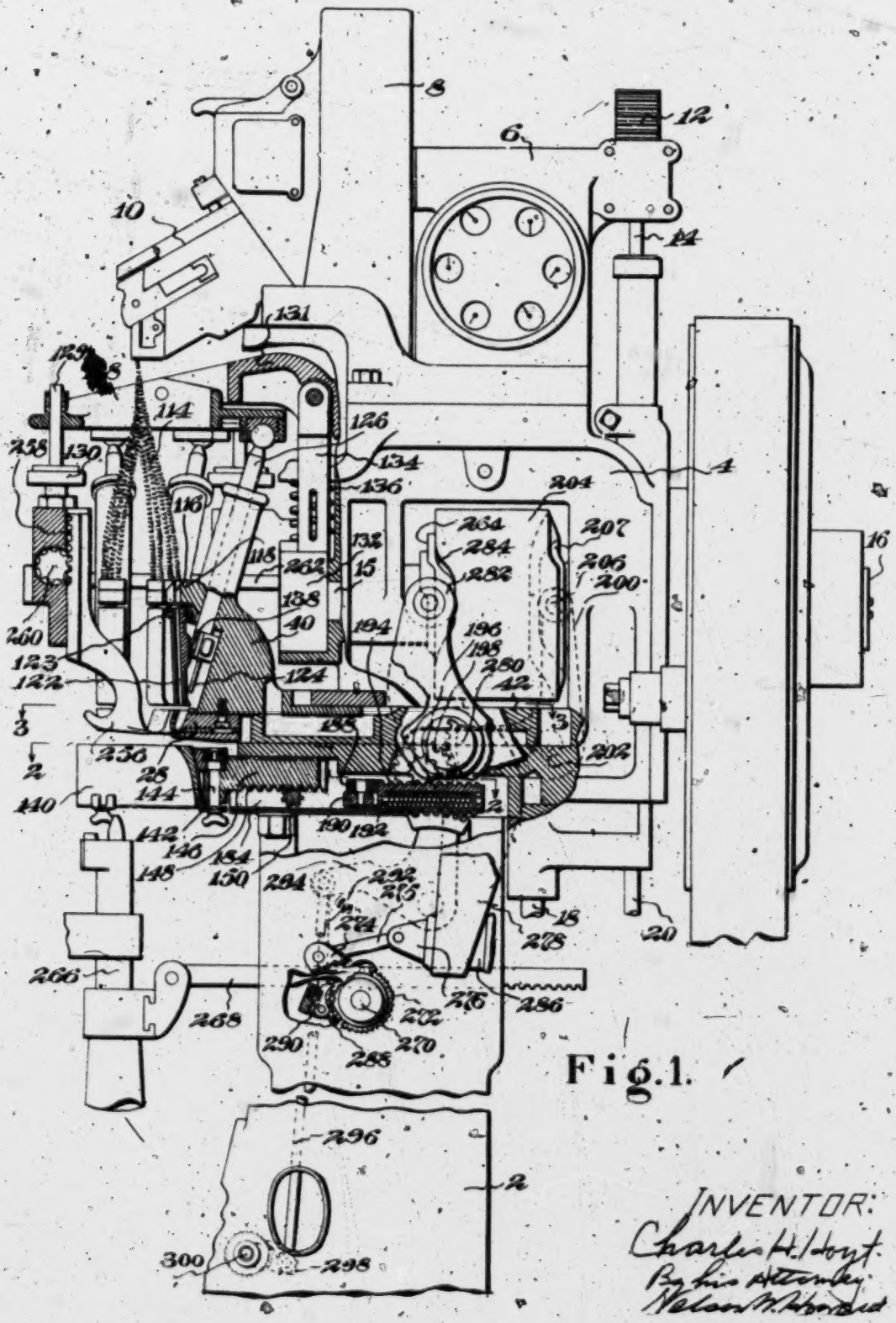


Fig. 1.

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Sept. 16, 1924. 1,508,394

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FASTENING INSERTING MACHINE

Filed Jan. 28, 1920 4 Sheets-Sheet 2

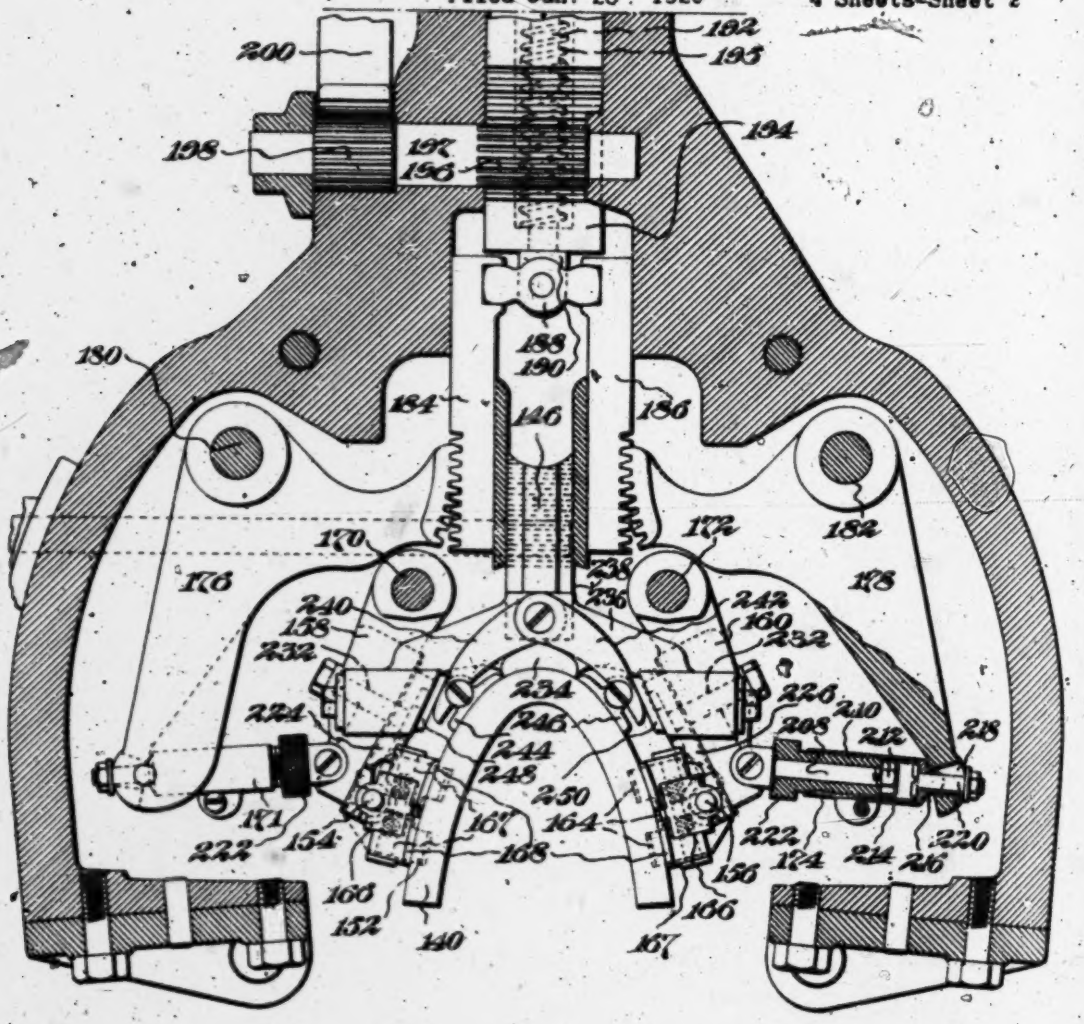
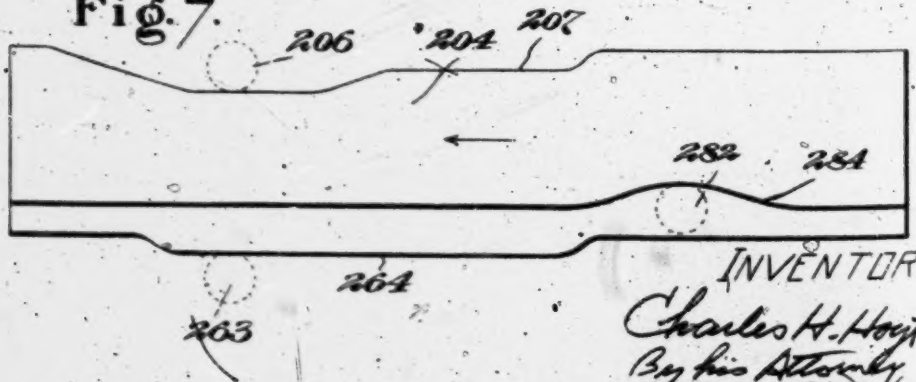


Fig. 2.

Fig. 7.



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Sept. 16, 1924. 1,508,394

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FASTENING INSERTING MACHINE

Filed Jan. 28. 1920 4 Sheets-Sheet 3

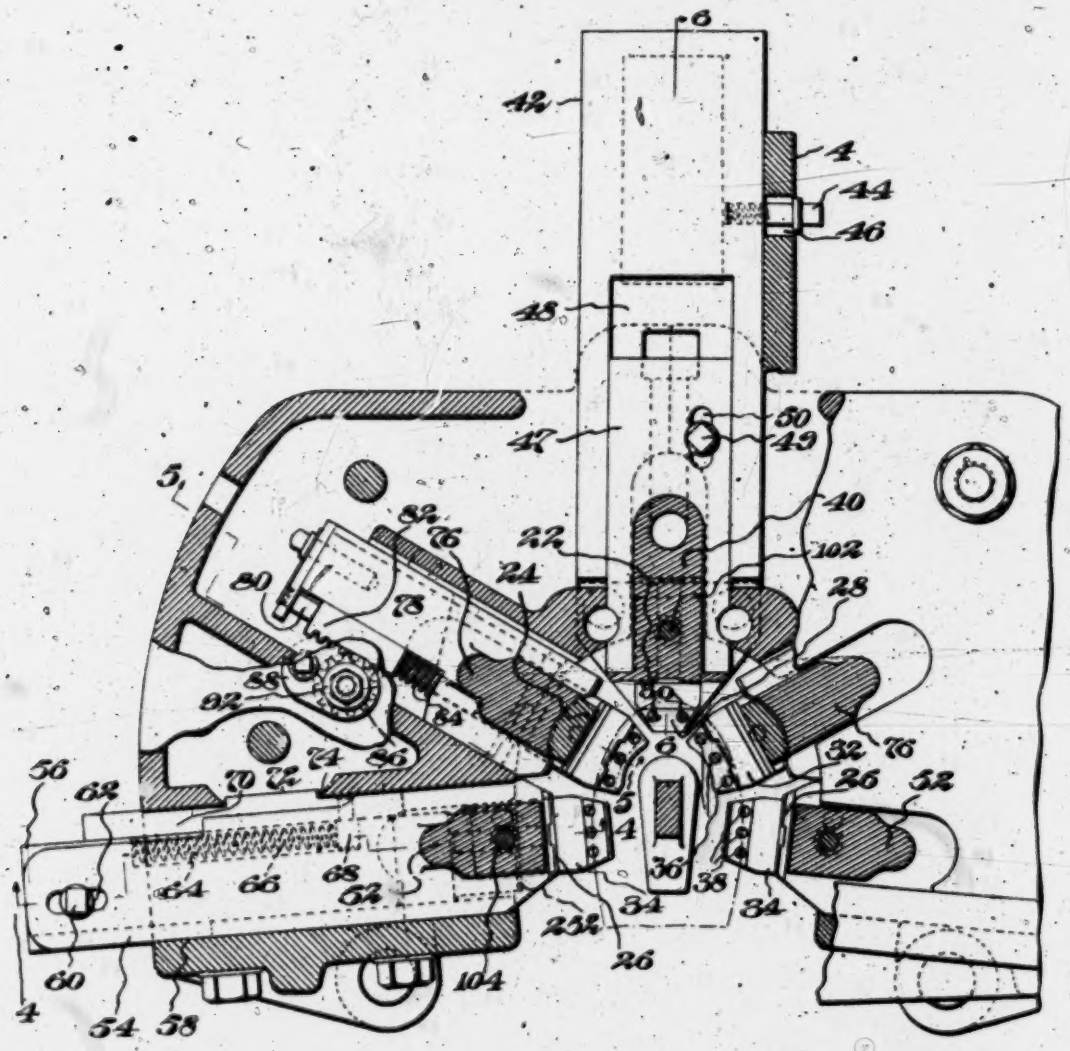


Fig. 3.

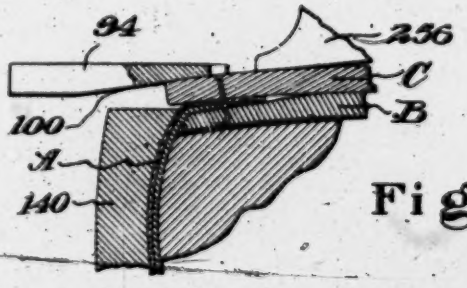


Fig. 8.

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FASTENING INSERTING MACHINE

Filed Jan. 28, 1920 4 Sheets-Sheet 4

Fig. 4.

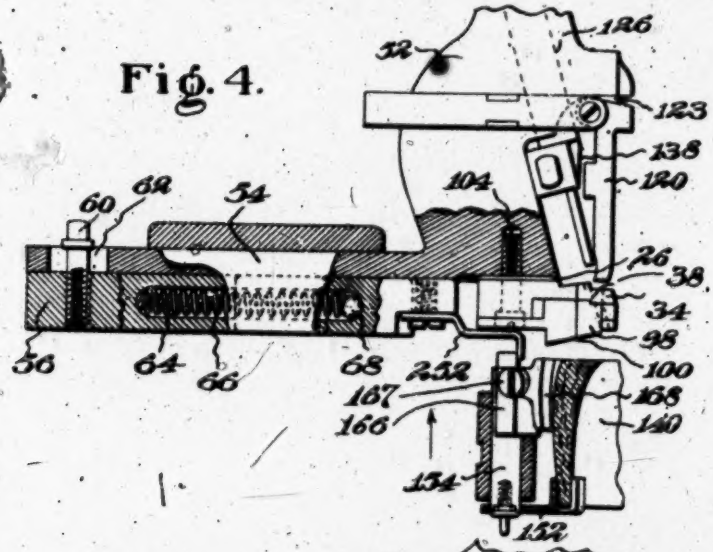


Fig. 5.

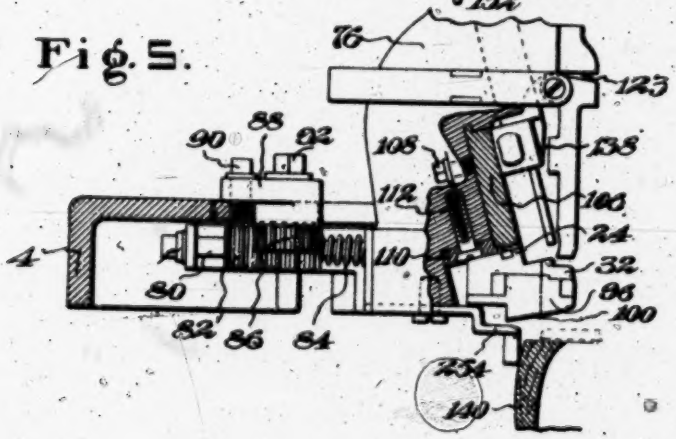
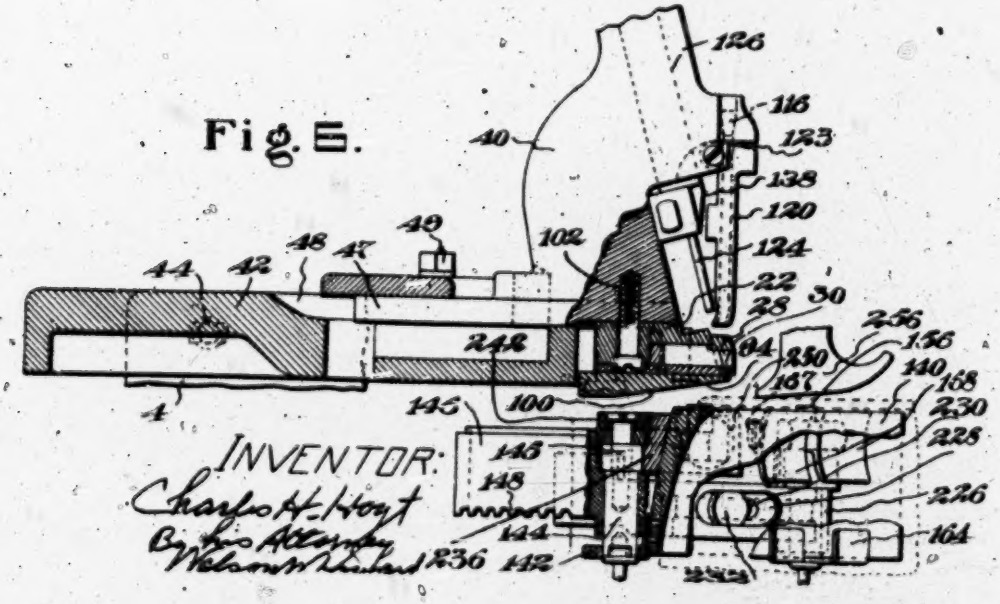


Fig. 6.



INVENTOR:
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Patented Sept. 16, 1924. 1,508,394

UNITED STATES PATENT OFFICE.

CHARLES H. HOYT, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FASTENING-INSERTING MACHINE.

Application filed January 28, 1920. Serial No. 354,726.

To all whom it may concern:

Be it known that I, CHARLES H. HOYT, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Fastening-Inserting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to fastening inserting machines, the embodiment of the invention herein illustrated and described being particularly intended for the attachment of the heel ends of outsoles in the manufacture of boots and shoes. It is recognized, however, that the invention as a whole and various features thereof are not limited in their application to the particular use illustrated, and that they may be usefully employed in other relations.

In the manufacture of boots and shoes, it is the usual practice to attach the heel seat end of the outsole to the upper and insole by fastenings inserted about the periphery of the heel seat, and it has also been customary to utilize for the insertion of the fastenings, machines of the type which insert fastenings successively. Although such machines are commonly provided with a shoe support and means for automatically feeding the shoe past the point of fastening insertion and for guiding the shoe as it is fed, it is necessary in order to insure that the fastenings will be rightly disposed with reference to each other and to the edge of the heel seat that the shoe be manipulated in certain definite relations to the parts of the machine during the driving of the fastenings. Such manipulation of the shoe requires the exercise of considerable skill and care on the part of the operator.

It is an object of the invention to provide a machine for attaching heel seats which can be operated very quickly and easily, and the use of which will require a minimum of skill and care on the part of the operator. To this end I have devised a novel organization including fastening inserting means of the type by which a number of fastenings are inserted in a piece of work in a single operation, the construction of the fastening inserting devices being such that substantially no manipulation of the work by the operator is called for other than that required for the presentation of the work to the machine and its removal therefrom.

It has hitherto been proposed to attach heel seats by means of machines constructed to insert a number of fastenings at a time. So far as applicant is aware, however, such machines have invariably comprised a single die plate or the like having openings to receive fastenings for presentation to all of the drivers of the machine. Manifestly, if it were desired to employ such machines for attaching heel seats of different sizes and shapes, it would be necessary to modify the arrangement of the openings in the die plate and the construction of the plate in order to maintain the relation of the fastenings and the edge of the heel seat uniform and properly to conform the edge of the heel seat end of the sole to the edge of the upper and insole. For this reason, it has been customary in the design of such machines to mount the die plate in such a way that it can be removed from the machine to enable a die plate of a different character to be substituted for it, when it is desired to adapt the machine for the attachment of heel seats of different dimensions from those previously operated upon. The substitution of different forms of die plates necessitates corresponding substitutions of the awls and drivers and other elements of the fastening inserting instrumentalities, thus rendering the adaptation of the machine to operation on heel seats of varying dimensions troublesome, in consequence of which such machines have not been used to any extent for attaching heel seats.

Machines have also been devised for inserting a number of fastenings substantially simultaneously which are provided with a plurality of separate fastening inserting mechanisms or units disposed correspondingly to the contour of a portion of the bottom of a shoe. Machines of such character, have, for instance, been employed for lasting shoes. Such machines, however, have not, to applicant's knowledge, been used for attaching heel seats nor has any of them been so constructed as to be capable of use for that purpose. One reason, among others, why such machines, as heretofore constructed, have not been adapted for use for attaching heel seats is that they have not

been provided with mechanism operable to shape the heel seat end of the sole to the upper and insole.

An important feature of this invention resides in a novel fastening organization of the multiple or "gang" type constructed for effective operation upon outsoles and including provision for relative movement of different fastening mechanisms to position the fastenings, the machine herein shown as an illustrative embodiment of the invention having a plurality of separate fastening inserting mechanisms and including means for applying conforming pressure to the outsole. The separate fastening inserting mechanisms in the construction shown are disposed correspondingly to the periphery of a heel seat and are made adjustable thus enabling applicant's machine to be readily adapted for operation on work of different characteristics, inasmuch as the removal of any part of the machine and the substitution of another part therefor is rendered unnecessary. The disadvantages attendant upon the use of prior machines of this type for the attachment of heel seats are thereby obviated. In the illustrated exemplification of the invention, each of the separate fastening inserting mechanisms comprises a throat having its under-side inclined downwardly and outwardly from its fastening receiving opening or openings for engagement with the tread face of a heel seat adjacent to its marginal edge to press the edge of the heel seat end of an outsole into close conformity with the edge of an upper and insole.

In accordance with a further feature the invention provides novel means of control for fastening inserting means, the machine illustrated having means for automatically positioning the fastening inserting mechanisms to accommodate them to heel seats of different dimensions so as to cause the fastenings to be inserted in proper relation to the contour edge of the heel seat and to enable the marginal edge of the heel seat to be accurately conformed to the upper and insole. In the construction shown the arrangement of the fastening inserting mechanisms when a piece of work is in position to have fastenings inserted in it by said mechanisms is determined by means for clamping the work. In the illustrated exemplification of the invention, the work clamping means comprises a flexible band acted upon by moving parts of the machine to conform it to the work and operatively connected to certain of the fastening inserting mechanisms on each side of the work. Other fastening inserting mechanisms are provided on each side of the work, which are controlled by the clamping band independently of the first-named fastening inserting mechanisms. It will be recognized that in this as well as other features the invention in its more general aspects is not limited to machines for fastening outsoles.

Other important features of the invention, including a novel construction of shoe end clamping means, will appear as the description proceeds and will be pointed out in the appended claims.

In the drawings,

Fig. 1 is a view in elevation and partly in cross-section of the upper part of a machine constructed in accordance with the invention;

Fig. 2 is a plan view substantially along the line 2—2 of Fig. 1;

Fig. 3 is a plan view substantially along the line 3—3 of Fig. 1;

Fig. 4 is a view in elevation, partly in cross-section substantially along the line 4—4 of Fig. 3, of one of the end fastening inserting mechanism or units and its connections to the work clamp;

Fig. 5 is a view in elevation, partly in cross-section substantially along the line 5—5 of Fig. 3, of one of the corner fastening inserting units and the work clamping band;

Fig. 6 is a view in elevation, partly in cross-section substantially along the line 6—6 of Fig. 3, through the rear fastening inserting unit and the work clamp;

Fig. 7 is a diagrammatic view of the main cam, illustrating the manner of operation of certain features of the invention; and

Fig. 8 is a cross-section of a shoe in nail driving position.

By way of example, the invention is illustrated as embodied in a machine of the same general type as that disclosed in United States Letters Patent to R. F. McFeely, No. 1,129,881, granted March 2, 1915, for improvements in machines for use in the manufacture of boots and shoes. The machine comprises a column 2 having mounted thereon a head 4 crowned by a frame 6 upon which is mounted a hopper 8 for supplying fastenings to raceways 10 at the front of the machine head. The hopper 8 is operated by means of a rack 12 carried by a rod 14 which is reciprocated by a cam (not shown) on a shaft 15 journaled in the head 4. The shaft 15 may be driven from a short shaft 16 by reducing gears of the character fully shown and described in the co-pending application of R. F. McFeely, Serial No. 115,230, filed August 16, 1916, for improvements in lasting machines. The shaft 16 may be operated as shown in Patent No. 1,129,881, and the operation of the shaft may be controlled by clutch mechanism of the character contemplated for the machine of the above-cited patent and fully shown and described in United States Letters Patent No. 791,986, granted on an application of R. F. McFeely, June 6, 1905. The clutch mechanism comprises a rod 18 adapt-

ed to be controlled by the operator in any suitable way, as for instance, by a foot treadle. When the rod 18 is raised, it actuates mechanism for causing movement to be transmitted to the shaft 16. The operation of the shaft 16 is discontinued at the end of each full revolution of the shaft 15 by the depression of a rod 20.

The illustrated machine is especially designed to insert fastenings of the kind generally denominated nails, and for convenience of description, certain features of the machine will be described by reference to their functions when the machine is used for inserting nails. It will be understood, however, that the term "nail" is used for purposes of exposition merely and not by way of limitation.

In accordance with the invention, the machine is provided with a plurality of nail inserting mechanisms or units, each comprising a throat and means for driving nails through passages in the throat. In the illustrated construction (see Fig. 3), there are provided a rear nail inserting unit 22 and two side nail inserting units 24 and 26 on each side of the space defined by said units. As shown also, the throat 28 of the rear unit is formed with two nail receiving passages 30, wheras each of the throats 32 and 34 of the side units 24 and 26 respectively, is provided with three nail receiving passages designated 36 and 38. It is manifest however, that the number of nail receiving passages in the throats 28, 32, and 34 may be varied without departing from the principles of the invention, and that the number and arrangement of the nail inserting mechanisms or units may also be modified. The rear nail inserting unit 22 comprises a casting 40 carried by a plate 42 mounted slidably in the head 4 of the machine. The plate 42 is adjustably secured to the head 4 by means of a screw or the like threaded into the plate and passing through a slot 46 in the head. The casting 40 has a part 47 extending rearwardly therefrom and received in a channel 48 of the plate 42. Adjustment of the casting 40 relatively to the plate 42 is provided for by means of a screw bolt 49 passing through a slot 50 in the extension 47 into the plate 42. With this arrangement, the throat 28 may be adjusted forwardly or backwardly on the machine head 4 in order properly to position the nail inserting until 22 for operation on heel seats of different dimensions.

For convenience of description, the nail inserting units 26 will be hereinafter sometimes termed the "end" units, and the units 24 will be referred to as the "corner" units. A description of one of the end units 26 will suffice for both of said units, inasmuch as they are similarly constructed. Likewise, a description of one of the corner units 24 will suffice for both. The end unit 26 comprises a casting 52 formed with a rearwardly extending part 54 adjustably secured to a plate 56 mounted for translatory movement in a guideway 58 of the head 4. As shown, the means for securing the casting 52 to the plate 56 comprises a screw 60 passing through a slot 62 in the extension 54. The plate 56 is recessed at 64 (see Fig. 4) to receive a spring 66 interposed between the rear wall of the recess and a pin 68 projecting into the recess. In the illustrated construction, the pin 68 is carried by a plate 70 having a lateral projection 72 fitting into an opening 74 in the adjacent wall of the head 4 of the machine. From the foregoing, it is apparent that the nail inserting unit 26 will normally be maintained by the spring 66 in a position determined by engagement of the pin 68 with the front wall of the recess 64.

The corner unit 24 comprises a casting 76 carried by a plate 78 slidably mounted in a guideway in the head 4 (see Figs. 2 and 5). The plate 78 may be secured to the casting 76 in any suitable manner or may be formed integrally therewith. Preferably, and as shown, means is provided for normally urging the casting 76 and the throat 32 mounted thereon toward the space defined by the nail inserting units. Conveniently, such means comprises a rod 80 on the plate 78 and a rack member 82 slidably supported on the rod, between which and a shoulder on the plate 78 is interposed a compression spring 84. To the end that the tension of the spring 84 may be regulated, the position of the rack member 82 is adjustably determined by a pinion 86 meshing with the rack. The pinion 86 is supported by a bracket 88 secured to the head 4 by a screw, or the like, 90. Rotation of the pinion 86 will effect adjustment of the rack member 82 on the rod 80. A nut 92 retains the pinion 86 in any position to which it may be moved.

The outer surface of the heel seat portion of an insole after it has been fitted to a last is more or less convex in planes transverse to the contour line of the heel seat. Consequently, the margin of the upper where it is folded over the insole in the lasting operation is inclined downwardly toward the edge of the insole when the lasted shoe is disposed in inverted position, as clearly appears from Fig. 8 in which the upper is designated A and the insole B. It is desirable that the heel seat portion C of the outsole shall be shaped to correspond with the configuration of the upper and insole. Accordingly, I have provided the throats 28, 32, and 34 with plates 94, 96 and 98 respectively having their lower surfaces 100 inclined downwardly and outwardly from their nail receiving passages to

a degree corresponding substantially with the inclination of the upper and insole. The surfaces 100 of the plates 94, 96, and 98 engage the tread surface of the heel seat end of the sole adjacent to its marginal edge and press it into close contact with the folded over margin of the upper. It is recognized that the plates 94, 96, and 98 upon which the heel seat molding surfaces are formed may be constructed integrally with the throats 28, 32, and 34 respectively, or means separate from the throats may be provided for shaping the heel seat without departing from the principle of the invention.

The nail receiving and controlling parts of the throats 28, 32 and 34 may be, and as shown, are constructed as fully illustrated and described in the copending application, above referred to. Inasmuch as the organization of such parts of the throats constitutes per se no part of the present invention, a further description thereof is deemed unnecessary. The throats may be secured to their respective castings in any suitable manner. As shown in Figs. 4 and 6, the throats 28 and 34 are fixed to the castings 40 and 52 by screws 102, 104 respectively, and the throat 32 is formed with an upstanding projection 106 which is dove-tailed into the front face of the casting 76 and retained in position by a set screw 108 and a plate 110 secured by screws 112.

The means for supplying nails to the nail receiving passages of the throats 28, 32 and 34 and for driving the nails is also more fully set forth in the copending application above referred to. Such means comprises flexible tubes 114 (see Fig. 1) adapted to receive nails from the several raceways 10. The tubes 114 communicate with openings 116 in ears 118 on the castings 40, 52, and 76 respectively. Each of said castings has pivoted thereto below the ear 118 a conductor 120 having openings 122 registering with the openings 116 in the ear 118 and normally positioned by springs 123 so as to deliver nails into the passages in the throat. The nails are forced into the work by drivers 124 carried by driver bars 126 arranged to be simultaneously actuated by a member 128 slidably mounted on posts 129 and limited in its downward movement by buffers 130. The member 128 is carried by a lever 131 fulcrumed in the head 4 of the machine and elevated by a cam 132 on the shaft 15 through the agency of an arm 134. The lever 131 is impelled downwardly to cause the drivers 124 to project the nails into the work by springs 136. The driver bars 126 have angular faces 138 which swing the conductors 120 out of the way of the drivers 124 in their nail driving movements.

Means is provided for presenting work to the nail inserting mechanisms in a manner to facilitate operation on the work. This means preferably comprises a clamping band 140 which is made substantially U-shaped to accord with the configuration of the counter or heel end of a shoe on which it is designed to act. The clamping band 140 is composed of leather or other suitable flexible material. In order to afford support for the band at its rear end or, in other words, at the bight of the band, a clip 142 (see Figs. 1 and 6) is riveted to the band at such point. The clip 142 is in turn carried by a stud shaft or post 144 loosely mounted in a carrier 146 slidable in a guideway on the head 4. Downward movement of the post 144 is limited by an enlarged part 145. In order to permit the clamping band 140 to be appropriately positioned for operation on shoes of varying sizes, the carrier 146 is adjustably secured to the head 4. A convenient means for effecting such adjustment comprises teeth 148 on the under side of the carrier meshing with a pinion 150 (see Fig. 1). The shaft of the pinion 150 may be provided with a handle to facilitate its rotation and may be retained in angularly adjusted position in various ways as will be obvious to those skilled in the art. Suitable means involving a pawl carried by the shaft and a ratchet mounted on the head 4 is shown in the copending application heretofore referred to.

The legs or sides of the clamping band 140 are supported by clips 152 carried by posts 154 and 156 mounted in arms 158 and 160 respectively. Each of the clips 152 is formed with upwardly extending flanges 164 (see Figs. 2 and 4) between which the lower edge of the band 140 is received. The legs of the band are constrained against transverse movement relatively to the flanges 164 but may have endwise movement with relation to said clips for a purpose which will hereinafter appear. The posts 154 and 156 have blocks 166 pivoted thereon for movement in horizontal planes and plates 168 are fulcrumed to the blocks 166 at 167 for movement in vertical planes. The pressure plates 168 have concave surfaces disposed for engagement with the outer surface of the band 140 to press it against the work, and the double pivotal movement of the plates enables them to contact closely with the band regardless of changes in the configuration of the band resulting from the presentation of work of different dimensions to the machine. The arms 158 and 160 are fulcrumed on the head 4 at 170 and 172 respectively and, as shown, are operated by links 171 and 174 from bell crank levers 176 and 178 pivoted at 180 and 182 to the head 4. Each of the bell crank levers 176 and 178 is formed with a toothed segmental portion, the segments being arranged to

mesh with rack bars 184 and 186 slidably mounted in the head 4. The arms 158 and 160 are moved synchronously toward and from the work to cause the band 140 to clamp or release the work by mechanism comprising an equalizer 188 having its ends received in recesses in the ends of the rack bars 184 and 186 respectively and carried by a head 190 on a rod 192 sleeved into a housing 194. A spring 195 interposed between the front wall of the housing 194 and a nut, or the like, on the rod 192 transmits movement from the housing yieldingly to the rod and thus to the arms 158 and 160 in a direction to press the clamping band 140 against the work. The housing 194 is toothed on its upper side for meshing engagement with a pinion 196. The shaft 197 (see Fig. 2) of the pinion 196 carries a larger pinion 198 co-acting with the toothed end of a bell crank lever 200 fulcrumed at 202 on the head 4 and having a roll 206 riding on a cam track 207 on the cam wheel 204.

In order that the degree of pressure on the legs of the clamping band 140 may be conveniently changed, if desired, or maintained uniform during operation on work of different dimensions, each of the links 171 and 174 comprises a rod 208 having its head pivotally connected to the arm 158 or 160 and its shank received in a sleeve 210 clamped on the rod between its head and a nut 212. The sleeve 210 is threaded on its outer surface for engagement with internal threads on the split thimble 214 having a rounded boss 216 on its closed end seated in an opening 218 in the arm 176 or 178. A rod 220 passing through the boss 216 secures the thimble 214 to the arm. With this construction, rotation of the sleeve 210 will lengthen or shorten the link 171 or 174, thus increasing or decreasing the pressure of the clamping band 140 on the work. The head 222 of the sleeve 210 is preferably knurled to facilitate the rotation of the sleeve.

To the end that the pressure plates 168 may be caused to act on the clamping band 140 when operating on shoes of certain dimensions, for example, relatively large shoes, at points more nearly adjacent to the ends of the band than when operating on small shoes, the posts 154 and 156 are mounted in plates 224 and 226 grooved into the arms 158 and 160 for adjustment longitudinally of the arms. In the illustrated construction (see Figs. 2 and 6), the plates 224 and 226 are channeled at 228, and the bottoms of the channels are formed with slots 230 through which pass bolts 232 having their heads received in the channels 228.

The back or bight of the band is maintained firmly against rearward movement by a brace 234 having its forward surface concave to conform with the outer surface of the band. As shown, the brace 234 is formed integrally with a yoke 236 loosely mounted on the enlarged portion 145 of the stud shaft 144. The yoke 236 is constrained against angular movement on the post 144 by engagement of its plane rear surface 238 with a shoulder surface on the carrier 146. Pivoted on the post 144 above the yoke 236 are arms 240 and 242 having pressure plates 244 and 246 pivoted thereto for movement in a horizontal plane. The plates 244 and 246 are yieldingly forced against the band 140 by spring-pressed plungers 248 and 250 seated in bosses on the ends of the yoke 236. The plates 244 and 246 engage the corners of the clamping band 140 and force such portions of the band into firm contact with the work. The provisions hereinbefore described for endwise movement of the legs of the clamping band 140 between the flanges 164 of the clips 152 permit the corners of the band to be pressed closely against the work regardless of variations in the shape or size of the work.

It will be clear from the foregoing that the nail inserting mechanisms or units 22, 24, and 26 may be moved relatively to each other and to the work to accommodate them to the requirements of work of different dimensions. As also clearly pointed out, the rear nail inserting unit 22, in the present exemplification of the invention, is designed to be adjusted manually. I prefer, however, for the sake of convenience of operation and flexibility of adjustment that the operative positions of the nail inserting units 24 and 26 be determined by the work itself. As shown, the clamping band 140 and its operating means are utilized to this end. The posts 154 and 156 are extended upwardly for engagement with the downturned ends of metal strips 252 secured to the plates 56 of the end units 26, and the plates 78 of the corner units 24 carry strips 254 whose downturned ends contact with the outer surface of the clamping band. Consequently, as the arms 158 and 160 are moved toward the work, the end units 26 are forced inwardly against the resistance of the springs 66, and the corner units 24 move inwardly with the band 140 under the impulse of the springs 84. The adjustable connection 60, 62 between the end units 26 and the plates 56 enables the throats 34 to be adjusted with relation to the heel band, thus permitting the distance of the fastenings from the edge of the heel seat to be varied as desired. Corresponding adjustments of the throats 32 of the corner units can be effected by shifting the strips 254 endwise on the plates 78.

In order to permit the marginal edge of the outsole to be accurately conformed to the edge of the upper and insole, the shoe is presented to the clamping band 140 with the surface of the outsole spaced from the upper surface of the band. It is desirable,

however, that the shoe be clamped as close to the outsole as possible and still permit the edge of the heel seat to be pressed down to the required degree. Means is accordingly provided for positioning the work with relation to the clamping band. In the illustrated construction, such means comprises a member 256 disposed for engagement with the surface of the heel seat within the space defined by the nail inserting units 22, 24 and 26. The work positioning member 256 is mounted for vertical sliding movement on the head 4 and, as shown, is provided with teeth 258 meshing with a pinion 260. The pinion 260 is operated by a rod 262 which derives its movement from a cam roll 263 (see Fig. 7) registering with the track 264 of the cam 204. Suitable operating connections between the work positioning member 256 and the cam 204 are described in the copending application above cited.

The work is supported on a jack 266 which may be constructed and operated substantially as shown and described in the aforementioned application. The jack 266 is moved in a direction to carry the work into the grip of the clamping band 140 by a rack bar 268 meshing with a pinion on a shaft 270 journaled in the column 2 of the machine. The shaft 270 carries a ratchet wheel 272 operated by a ratchet (not shown) on an arm 274 which is in turn connected to a link 275 pivoted to the head 206 of a rod mounted loosely in the end of a lever 278. The lever 278 is fulcrumed on the head 4 of the machine at 280 and carries a roll 282 registering with a track 284 on the cam wheel 204. The rod having the head 276 is enclosed on the side of the lever 278 opposite from said head by a sleeve 286, between which and an enlarged portion of the rod is interposed a spring by which movement of the lever to the right (Fig. 1) is transmitted yieldingly to the shaft 270 and the jack 266. The shaft 270 also carries a ratchet 288 to which movement is transmitted by a pawl 290 operated by a link 292 connected to one arm of a bell crank 294 fulcrumed on the column 2 on the machine and having its other arm in the form of a toothed segment meshing with teeth on the under side of the housing 194. A second link 296 extends from the bell crank lever 294 to an arm 298 on the shaft 300 journaled in the column 2 of the machine frame. A pawl carried by the arm 298 and acting on a ratchet on the shaft serves to impart upward movement to the jack 266 in a manner which will be obvious to those skilled in the art. The link 296 is preferably made in two sections having a spring interposed between them, as shown in the aforementioned application, to the end that the movement of the bell crank lever 294 will be yieldingly communicated to the jack 266.

The clutch mechanism is arranged to bring the machine to rest with the arms 158 and 160 separated to the maximum extent to open the clamping band 140. The jack 266 occupies at the same time its fully lowered position and is tipped forwardly to facilitate the presentation of work to the jack. The work positioning member 256 is at the limit of its downward movement. To operate the machine, the operator places the work on the jack 266 and by means of a treadle (not shown) raises the jack to bring the heel seat into engagement with the positioning member 256 which, as before stated, locates the work with the edge of the heel seat spaced by the proper distance from the upper edge face of the heel band. He then depresses a treadle to start the machine. When power is applied to the machine the cam 204 is rotated in the direction of the arrow on Fig. 7. As the cam rotates the roll 282 on the lever 278 rides on a raised portion of the cam track 284, thereby moving the jack 266 back yieldingly to thrust the work into the band 140. As the cam continues to rotate, a raised portion of the cam track 207 acts on the roll 206 of the bell crank lever 200 to move the arms 158 and 160 inwardly to press the clamping band 140 against the work and simultaneously to actuate the bell crank lever 294. When the bell crank lever 294 is actuated, it moves the jack 266 positively to thrust the work further into the grip of the band 140 and exerts an upward pull on the link 296 thus tending to move the jack upwardly. By reason, however, of the upper surface of the heel seat being in engagement with the work positioning member 256, the jack 266 is moved upwardly at this time only to the extent to which the work yields, the main movement of the link 296 being taken up by the spring connections in said link and serving to apply pressure on the work. In the continued operation of the machine, the roll 263 which controls the work positioning member 256, moves onto a depressed part of the cam track 264, thus permitting the positioning member 256 to be lifted. At the same time, a further rise on the cam track 207 engages the cam roll 206 on the bell crank lever 200 to cause the jack 266 to be raised with the positioning member 256 without lessening the spring pressure on the work. The work positioning member 256, the jack 266, and the work move upwardly together until the work contacts with the under surfaces 100 of the throats 28, 32, and 34, after which, the continued movement of the member 256 elevates said member above the surface of the heel seat. The inward movement of the arms 158 and 160 is transmitted to the end

nail inserting units 26 by the strips 252 and posts 154 and 156, and the upward pressure of the work against the inclined surfaces 100 of the throats causes the contour edge of the heel seat end of the outsole to be pressed down firmly on the upper and insole. As clearly appears from Figs. 1, 4, and 6 the clips 142 and 152 are connected to the posts 144, 154, and 156 at points normally spaced from the lower surfaces of the carrier 146 and the arms 158 and 160. Consequently, as the work moves upwardly, the clamping band 140 partakes of such movement. While the above-described operations are being effected, the nail supplying mechanism is operated to deliver nails to the nail receiving passages of the throats, and after the work has been pressed upwardly against the throats, the driver cam arrives at a point in the cycle of its movement which permits the drivers to be forced down to drive the nails into the work. The further rotation of the cam shaft releases the [illegible] of the clamping band 140 on the work and lowers the jack, at the same time moving it outwardly from the machine to facilitate the removal of the finished work and the substitution of other work therefor. The work positioning member 256 is also lowered to a position properly to locate the fresh piece of work relatively to the clamping band, after which the machine again comes to rest.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, the combination of separate fastening inserting mechanisms, work supporting means operable to press the heel seat portion of the sole of a shoe into engagement with said mechanisms in one position of the shoe, and means for operating said mechanisms to attach the heel seat portion of the sole to the shoe.

2. In a machine of the class described, the combination of a plurality of fastening inserting mechanisms constructed to conform the heel seat portion of the sole of a shoe to the edge of the upper and insole of the shoe and relatively movable to position the fastenings, and means for operating said mechanisms to attach the heel seat portion of the sole to the shoe.

3. In a machine of the class described, means for attaching the heel seat portion of a sole to a shoe constructed to conform the marginal edge of the heel seat to the edge of the upper and insole, said means comprising a plurality of fastening inserting mechanisms relatively movable to vary the fastening locations.

4. In a machine of the class described, means for attaching the heel seat portion of a sole to a shoe comprising separate fastening inserting mechanisms, each including a throat constructed and arranged for engagement with the heel seat and means for driving fastenings through said throats.

5. In a machine of the class described, means for attaching the heel seat portion of a sole to a shoe comprising a plurality of fastening inserting mechanisms disposed correspondingly to the contour of the heel end of a shoe and relatively movable to conform to different shoe contours, and means for supporting a shoe for operation thereon by said mechanisms.

6. In a machine of the class described, the combination of separate fastening inserting mechanisms disposed correspondingly to the contour of the heel end of a shoe and having surfaces inclined outwardly and downwardly from the their respective points of fastening insertion, means for pressing the heel seat portion of the sole of the shoe into engagement with said surfaces, and means for operating said mechanisms to attach the heel seat portion of the sole to the shoe.

7. In a machine of the class described, the combination of a plurality of fastening inserting mechanisms disposed correspondingly to the contour of the heel end of a shoe, means for relatively positioning said mechanisms in accordance with variations in the dimensions of the shoes being operated upon, means for pressing the heel seat portion of the sole of a shoe into engagement with said mechanisms, and means for operating said mechanisms to attach the heel seat portion of the sole to the shoe.

8. In a machine of the class described, the combination of fastening inserting means comprising a plurality of fastening receiving throats disposed correspondingly to the contour of the heel end of a shoe, and relatively movable in accordance with variations in the dimensions of shoes, means for presenting the heel seat portion of the sole of a shoe in operative relation to said throats, and means for operating the fastening inserting means to attach the heel seat portion of the sole to the shoe.

9. In a machine of the class described, the combination of fastening inserting means comprising a plurality of fastening receiving throats, means controlled by the shoes being operated upon for positioning the throats relatively to the heel seat portion of the sole of a shoe to cause fastenings to be inserted at substantially uniform distances from the edges of the shoes regardless of variation in the dimensions of the shoes, and means for operating the fastening inserting means to attach the heel seats to the shoe.

10. In a machine of the class described, mechanism for attaching the heel seat portion of a sole to a shoe, comprising a plu-

rality of fastening receiving throats disposed on each side of the heel seat, a member shaped to conform to the heel end of a shoe, and means controlled by said member for determining the relative arrangement of the throats on one side of the shoe.

11. In a machine of the class described, means for attaching the heel seat portion of a sole to a shoe comprising a plurality of fastening inserting mechanisms disposed on each side of the heel seat, a member shaped to conform to the heel end of a shoe, and means movable with each of said mechanisms and co-acting with said member to determine the relative positions of said mechanisms with relation to the heel-seat and to each other.

12. In a machine of the class described, mechanism for attaching the heel seat portion of a sole to a shoe comprising separate fastening inserting instrumentalities constructed and arranged to conform the marginal edge of the heel seat portion of the sole to the rounded edge of the upper and insole, a member shaped to correspond substantially to the contour of the heel end of a shoe, and means controlled by said member for determining the arrangement of the fastening inserting instrumentalities relatively to each other and to the shoe.

13. In a machine of the class described, mechanism for attaching the heel seat portion of a sole to a shoe, comprising a plurality of fastening receiving throats on each side of the shoe, means for clamping the heel end of a shoe, and devices controlled by the clamping means for positioning said throats.

14. In a machine of the class described, the combination of a plurality of fastening inserting mechanisms for each side of the heel end of a shoe, means tending normally to move certain of said mechanisms at each side of the shoe in opposite directions, means for clamping the heel end of the shoe, and means controlled by said clamping means for positioning the fastening inserting mechanisms in different relative positions in accordance with variations in the dimensions of the heel ends of the shoes operated upon.

15. In a machine of the class described, separate fastening inserting mechanisms disposed correspondingly to the contour of the heel end of a shoe and comprising a plurality of throats on the same side of the shoe, means for clamping the heel end of the shoe, and means continuously under control of said clamping means at spaced points along the shoe for determining the arrangement of said throats relatively to the shoe.

16. In a machine of the class described, mechanism for attaching the heel seat portion of a sole to a shoe, comprising separate fastening inserting mechanisms, certain of said mechanisms being arranged in spaced relation on the same side of the shoe, means for clamping the heel end of the shoe comprising a flexible band, and means co-acting with the clamping means at spaced points along the shoe for positioning the fastening inserting mechanisms in different relative positions in accordance with variations in the dimensions of the heel ends of the shoes operated upon, said positioning means comprising members disposed for engagement with said band.

17. In a machine of the class described, the combination of fastening inserting means, means for clamping the heel end of a shoe mounted for movement with the shoe toward and from the fastening inserting means, and means movable with the clamping means for adjusting the fastening inserting means relatively to the shoe.

18. In a machine of the class described, the combination of fastening inserting means, means for moving a shoe into operative relation to the fastening inserting means, means for clamping the shoe, and means carried by the clamping means for adjusting the fastening inserting means relatively to the shoe.

19. In a machine of the class described, the combination of fastening inserting means, means for positioning a shoe in relation to the fastening inserting means comprising a substantially U-shaped flexible band operable to clamp the heel end of the shoe, an operating member and unyielding connections between said member and the band for forcing the ends of the band against the shoe, and separate yielding means operating on each side of the band adjacent to the bight of the band to press such portions of the band against the shoe.

20. In a machine of the class described, the combination of fastening inserting means, means for positioning a shoe in relation to the fastening inserting means comprising a substantially U-shaped flexible band, supporting means secured to the bight of the band, members carried by the supporting means for engagement with opposite sides of the band, and means individual to said different members for pressing the band yieldingly toward the shoe.

21. In a machine of the class described, the combination of fastening inserting means, means for positioning a shoe in relation to the fastening inserting means comprising a substantially U-shaped flexible band operable to clamp the heel end of the shoe, means for supporting the band, devices comprising arms loosely mounted on the supporting means, and means normally operative to press said devices against the band.

22. In a machine of the class described, the combination of fastening inserting means, means for positioning a shoe in rela-

tion to the fastening inserting means comprising a substantially U-shaped flexible band operable to clamp the heel end of the shoe, means for supporting the band, arms loosely mounted on said supporting means, and means carried by the supporting means for pressing the arms yieldingly against the band.

23. In a machine of the class described, the combination of separate fastening inserting mechanisms disposed correspondingly to the contour of the heel end of a shoe and constructed and arranged to conform the marginal edge of the heel seat portion of the outsole to the edge of the upper and insole, means for clamping the heel end of the shoe, means for engaging the heel seat portion of the outsole intermediate between certain of said mechanisms to position the shoe relatively to the clamping means, and means for pressing the shoe into engagement with the fastening inserting mechanisms.

24. In a machine of the class described, the combination of separate fastening inserting mechanisms for attaching the heel seat portion of an outsole to a shoe, means for clamping the heel end of the shoe, means co-operating with the fastening inserting mechanisms for positioning a shoe relatively to the clamping means with the adjacent surface of the outsole spaced from the upper surface of the clamping means, means for raising the positioning means out of engagement with the shoe after it is clamped, means for raising the shoe into operative relation to the fastening inserting mechanisms, and means for operating said mechanisms to attach the heel seat to the shoe.

25. In a machine of the class described, the combination of separate fastening inserting mechanisms for securing the heel seat portion of an outsole to a shoe, means for clamping the shoe, and means for positioning the shoe relatively to the clamping means with the heel seat portion of the outsole spaced from the clamping means by a distance sufficient to permit the contour edge of the sole to be pressed downwardly on the shoe to conform it to the edge of the upper and insole.

26. In a machine of the class described, means for clamping the heel end of a shoe in a location spaced from the outsole, and means for securing the outsole to the shoe constructed and arranged to conform the marginal edge of the heel seat portion of the outsole to the edge of the upper and insole.

27. In a machine of the class described, the combination of independently movable fastening inserting mechanisms arranged to operate in spaced locations at the same side of a shoe, a substantially U-shaped member for clamping the shoe, and independent means for maintaining the fastening inserting mechanisms constantly under the control of said member.

28. In a machine of the class described, the combination of fastening inserting mechanism, a substantially U-shaped member for clamping a shoe in operative relation to said mechanism, means for normally urging said mechanism away from the shoe, and connections between the clamping means and said mechanism for moving said mechanism toward the shoe.

29. In a machine of the class described, the combination of separate fastening inserting mechanisms disposed correspondingly to the contour of the heel seat portion of the sole of a shoe, a substantially U-shaped member adapted to embrace the heel end of a shoe, connections between said member and certain of said fastening inserting mechanisms for moving the fastening inserting mechanisms into position to insert fastenings in spaced relation to the edge of the heel seat portion of the sole, and means controlled by said member for positioning other of said fastening inserting mechanisms in determinate relation to the edge of the heel seat.

30. In a machine of the class described, the combination of separate fastening inserting mechanisms arranged in a curve corresponding substantially to the contour edge of the heel seat portion of the sole of a shoe, a substantially U-shaped member adapted to embrace the heel end of a shoe, means normally operative to urge certain of said mechanisms away from the shoe, means normally operative to urge certain of said mechanisms toward the shoe, and devices controlled by said member for determining the positions of the several mechanisms with relation to the contour edge of the heel seat.

31. In a machine of the class described, the combination with shoe positioning means, of a plurality of fastening inserting mechanisms for inserting fastenings to secure the outsole to other parts of the shoe, said mechanisms being relatively movable to position the fastenings, and means for effecting relative movement between the shoe and said fastening inserting mechanisms to apply conforming pressure to the outsole by engagement with said mechanisms.

32. In a machine of the class described, the combination with means for supporting a last and shoe materials including an outsole, of means for applying conforming pressure to the outsole over the bottom of the last and for fastening the outsole to other parts of the shoe comprising a plurality of fastening inserting mechanisms

arranged for driving fastenings along the margin of the outsole, said mechanisms being relatively movable to position the fastenings.

33. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of fastening inserting mechanisms mounted to close inwardly along the plane of the outsole into positions for inserting fastenings along the margin of the heel seat end of the outsole, and means for applying conforming pressure to the margin of the outsole prepatory to the insertion of the fastenings.

34. In a machine of the class described, the combination with means for supporting a last and shoe materials including an outsole, of a plurality of fastening inserting mechanisms arranged for inserting fastenings along the margin of the heel seat end of the outsole and relatively movable to position the fastenings, each of said fastening inserting mechanisms having means thereon for engaging the margin of the outsole and applying thereto conforming pressure over the heel seat face of the last, and means for effecting relative movement between said mechanisms and the shoe in the direction of the height of the shoe for subjecting the sole to such pressure.

35. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of fastening inserting mechanisms arranged for inserting fastenings along the margin of the heel seat end of the outsole and relatively movable to position the fastenings, each of said fastening inserting mechanisms having means thereon which is unyielding with respect to movement heightwise of the shoe and arranged to apply conforming pressure to the margin of the outsole.

36. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of fastening inserting mechanisms for inserting fastenings to secure the outsole to other parts of the shoe, and means enabling the operator to adjust different fastening inserting mechanisms independently to vary the location of fastenings.

37. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of fastening inserting mechanisms arranged for inserting fastenings along the margin of the heel seat end of the outsole to secure the outsole to other parts of the shoe, and means controlled by each shoe for determining the relative locations of the fastening inserting mechanisms for that shoe.

38. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of fastening inserting mechanisms arranged for inserting fastenings along the margin of the heel seat end of the outsole to secure the outsole to other parts of the shoe, and means controlled by each shoe for determining the relative locations of the fastening inserting mechanisms for that shoe, different fastening inserting mechanisms being also adjustable to vary the locations of the fastenings.

39. In a machine of the class described, the combination with means for inserting fastenings round the heel seat end of an outsole to secure the outsole to other parts of a shoe, of means for clamping the shoe at its heel end to position it for the outsole fastening operation, and means for moving the shoe and said clamping means together toward the fastening means to apply conforming pressure to the outsole.

40. In a machine of the class described, the combination with a plurality of fastening inserting mechanisms for inserting fastenings along the margin of the heel seat end of an outsole, each of said mechanisms having means thereon for applying conforming pressure to the margin of the outsole, of a band for embracing the heel end of the shoe, said band being movable heightwise of the shoe, and means for moving the shoe and said band together in such direction to force the outsole against said conforming means.

41. In a machine of the class described, the combination of means for positioning a shoe including an outsole, comprising a band constructed to embrace the heel end of the shoe in a location spaced from the outsole, and means for operating upon the shoe as thus positioned to apply conforming pressure to the outsole and to fasten the outsole to other parts of the shoe.

42. In a machine of the class described, the combination with means for inserting fastenings to secure the heel end of an outsole to other parts of a shoe, of a member for engaging the heel seat face of the outsole to position the shoe when the shoe is presented to the machine, and a band arranged to close about the heel end of the shoe in a location spaced from the outsole as thus positioned to assist in positioning the shoe relatively to the fastening inserting means.

43. In a machine of the class described, the combination with a plurality of fastening inserting mechanisms arranged for inserting fastenings along the margin of the heel end of an outsole to secure the outsole to other parts of a shoe, of a member for engaging the intermediate portion of the heel seat face of the outsole to position the shoe when the shoe is presented to the ma-

chine, and means for moving said member and the shoe in a direction to engage the margin of the outsole with said fastening inserting mechanisms for applying conforming pressure to said margin.

44. In a machine of the class described, the combination with a member movable into position to apply clamping pressure on the lateral periphery of a shoe, of fastening inserting mechanism supported independently of said member for positioning movement relatively to the shoe, and mechanism movable with and controlled by said clamping member for moving said fastening inserting mechanism with said member to an operative position determined by said member.

45. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of fastening inserting mechanism supported independently of said band for positioning movement relatively to the shoe, and means for controlling the positioning movement of said mechanism by the closing of the band.

46. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of fastening inserting mechanism supported independently of said band for movement inwardly into position for inserting one or more fastenings in the bottom of the shoe, and a connection between said fastening inserting mechanism and the band for moving said mechanism inwardly as the band closes about the shoe.

47. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of fastening inserting mechanism movable into and out of position for inserting one or more fastenings in the bottom of the shoe, spring means for forcing said mechanism outwardly from operative position, and a connection for moving said mechanism inwardly by the closing movement of the band.

48. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of fastening inserting mechanism supported independently of said band for positioning movement relatively to the shoe, and a device operative in all positions of the band for determining the position of said mechanism by the position of the band.

49. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of fastening inserting mechanism movable into and out of position for inserting one or more fastenings in the bottom of the shoe, spring means for forcing said mechanism inwardly toward operative position, and a stop member connected to said mechanism and constantly under control of the band for determining the position to which said mechanism is moved by said spring means.

50. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of a plurality of fastening inserting mechanisms supported independently of said band for movements inwardly into position for inserting fastenings along the margin of the shoe bottom at the opposite sides of the shoe, and controlling means to cause said mechanisms to move inwardly into fastening inserting position as the band is closed about the shoe.

51. In a machine of the class described, the combination with a band arranged to close about the end of a shoe, of a plurality of fastening inserting mechanisms supported independently of said band for movements inwardly into position for inserting fastenings along the margin of the shoe bottom at the opposite sides of the shoe, and devices automatically operative in the closing of the band to position said mechanisms in a relation to the shoe determined by the band.

52. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of devices for driving fastenings along the margin of the heel seat end of the outsole to fasten the outsole to other parts of the shoe, means for automatically positioning said devices in accordance with the shape and size of the shoe for driving the fastenings at predetermined distances from the edge of the outsole, and means for applying conforming pressure to the heel seat end of the outsole prior to the driving of the fastenings.

53. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of a plurality of devices for driving fastenings along the margin of the heel seat end of the outsole to fasten the outsole to other parts of the shoe, a member for embracing the heel end of the shoe, means controlled by said member for determining the relative positions of said devices in accordance with the shape and size of the shoe, and means for applying conforming pressure to the heel seat end of the outsole prior to the driving of the fastenings.

54. In a machine of the class described, the combination with means for supporting a shoe including an outsole, of means for driving fastenings to secure the heel seat end of the outsole to other parts of the shoe, and means for applying conforming pressure to the heel seat end of the outsole, said conforming means being adjustable for different shapes and sizes of shoes.

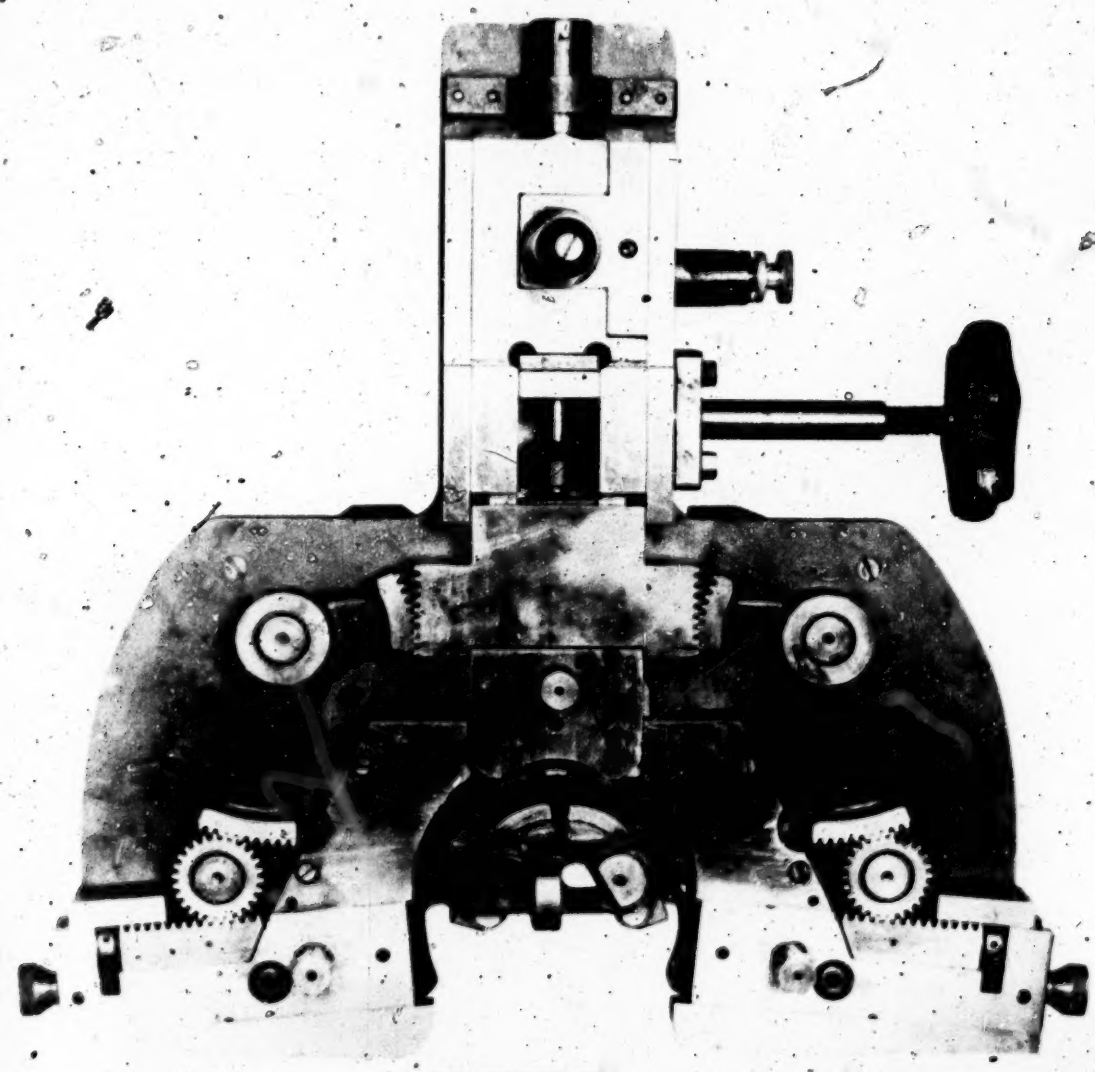
55. In a machine of the class described, the combination with means for supporting

a shoe including an outsole, of a plurality of devices for driving fastenings to secure the heel seat end of the outsole to other parts of the shoe, means for applying conforming pressure along the margin of the heel seat end of the outsole preparatory to the driving of the fastenings, and automatic means for adjusting said driving devices and said conforming means in accordance with the shape and size of the shoe.

56. In a machine of the class described, the combination with fastening inserting means, of means for clamping the heel end of a shoe in position for the operation of said fastening inserting means, and mechanism movable with and controlled by said clamping means to position said fastening inserting means in operative relation to the shoe.

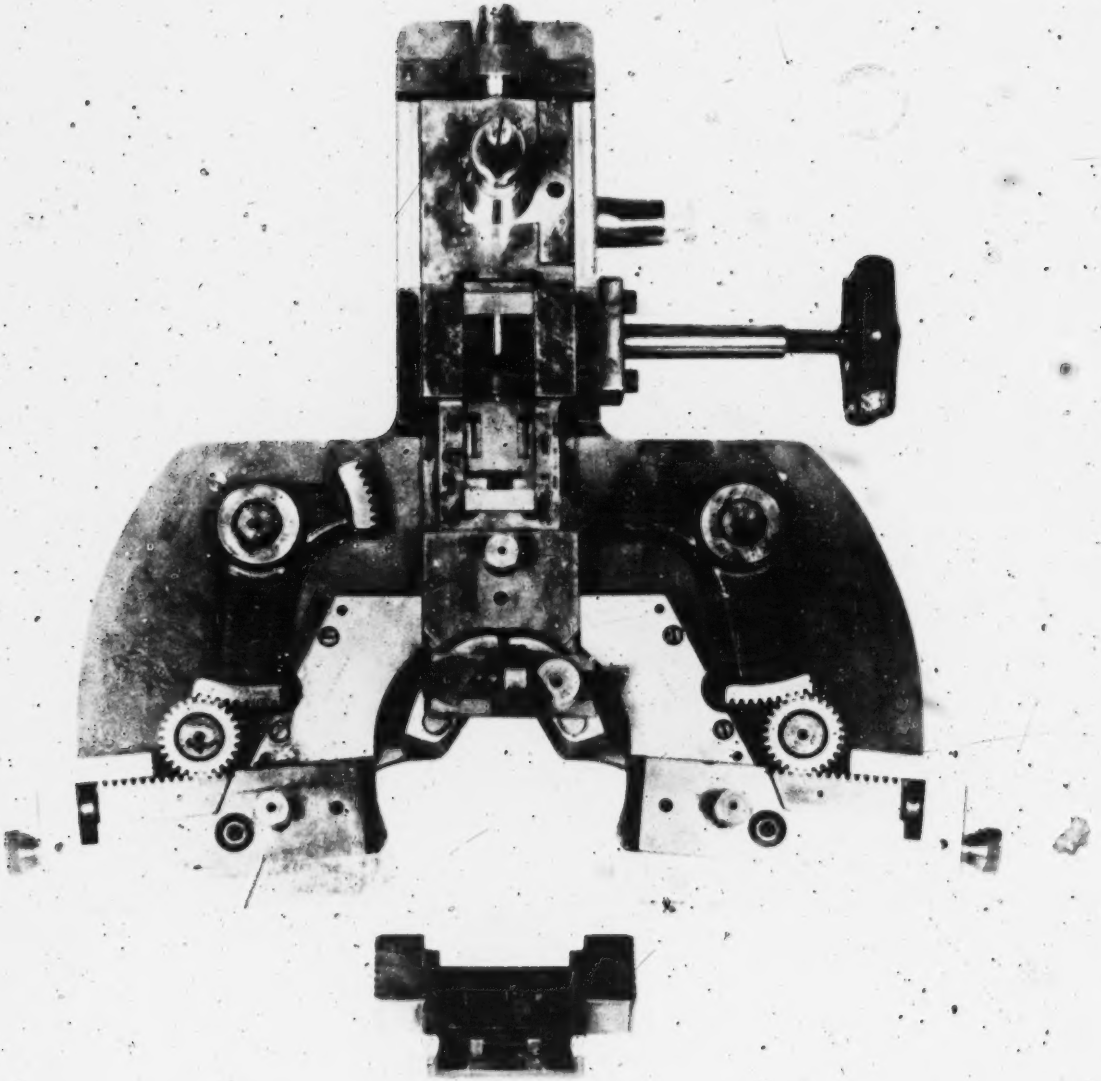
In testimony whereof I have signed my name to this specification.

CHARLES H. HOYT.



23-A

Plate E, 23 a



Val. 23-B

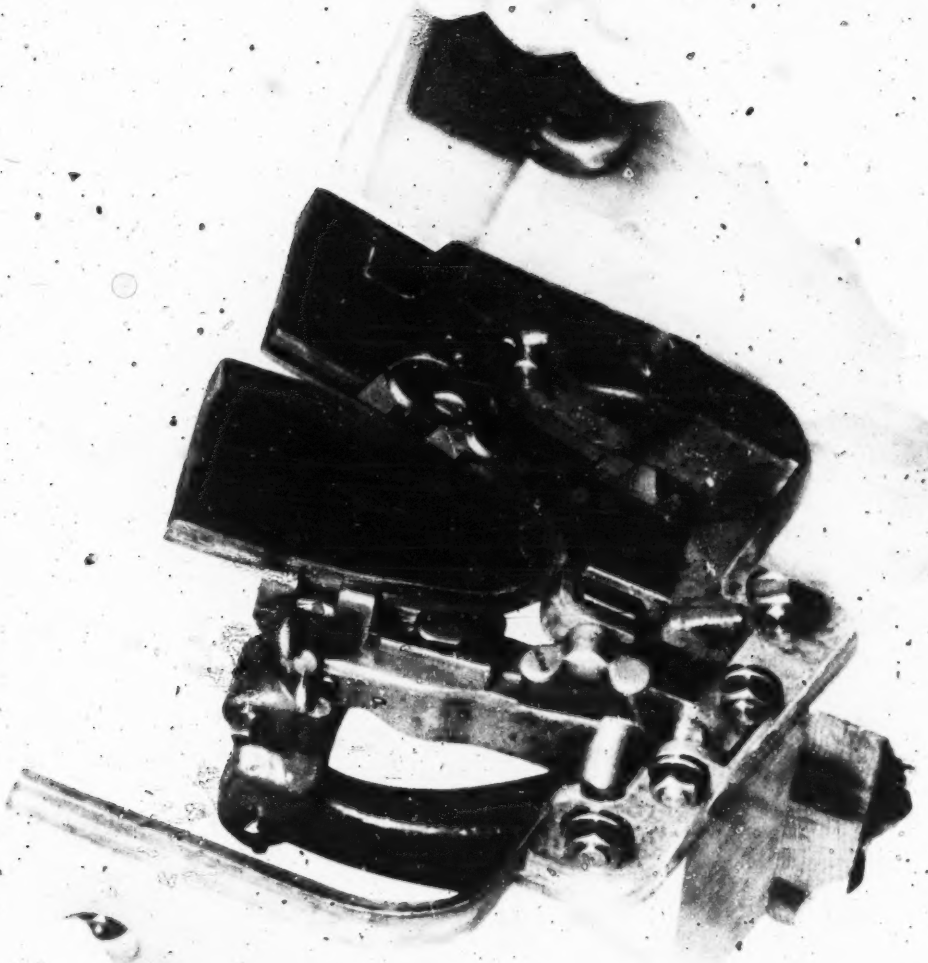
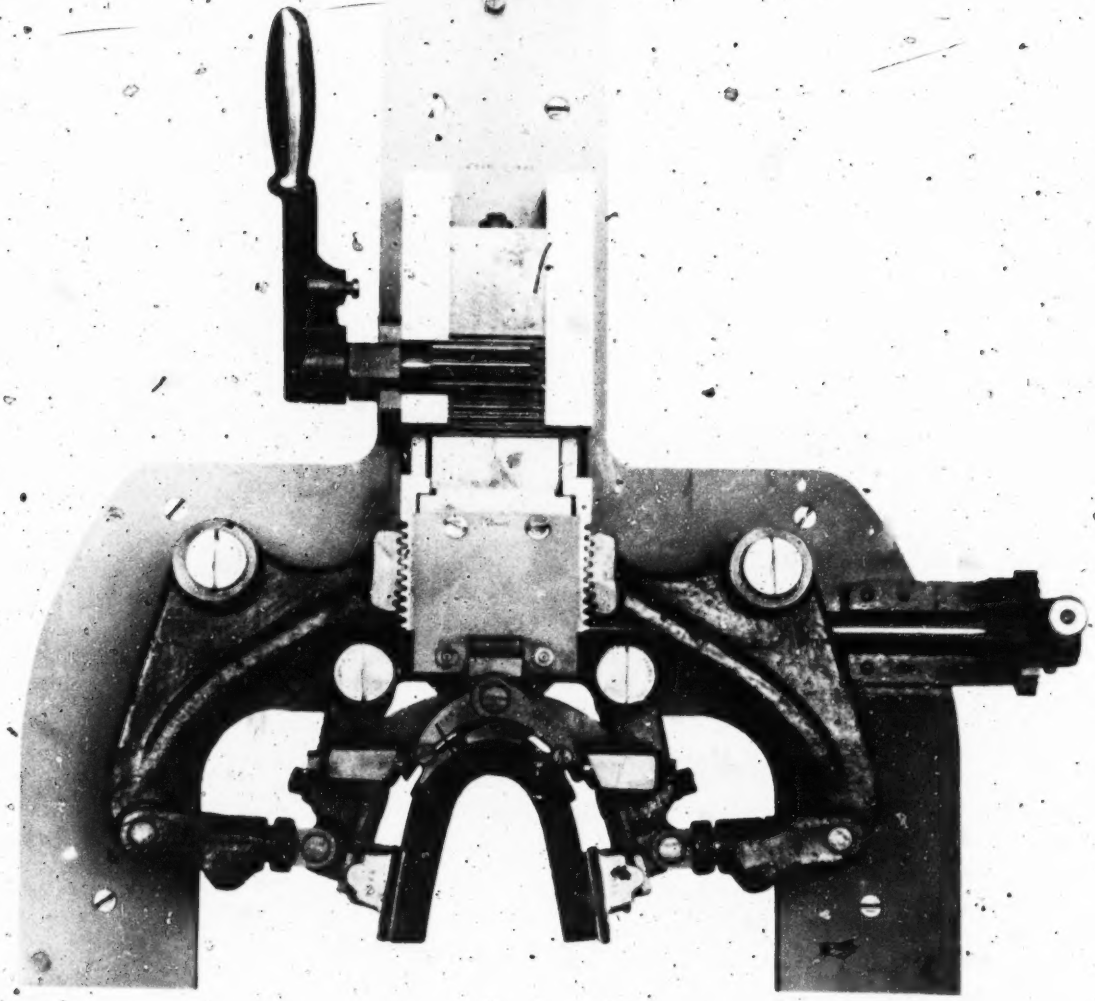


Plate 20-C



FLUOROX
23-D

P. 23-E

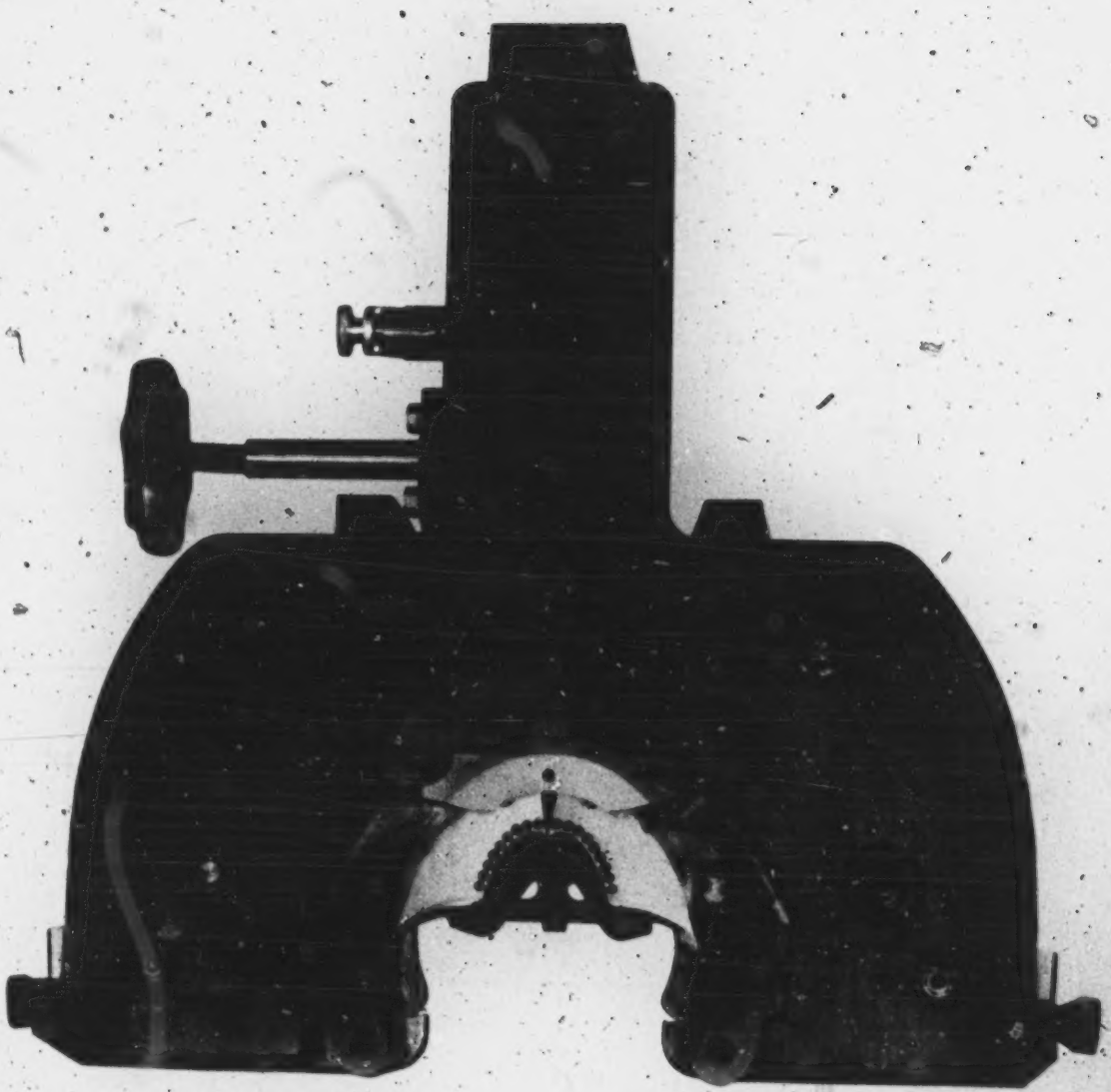
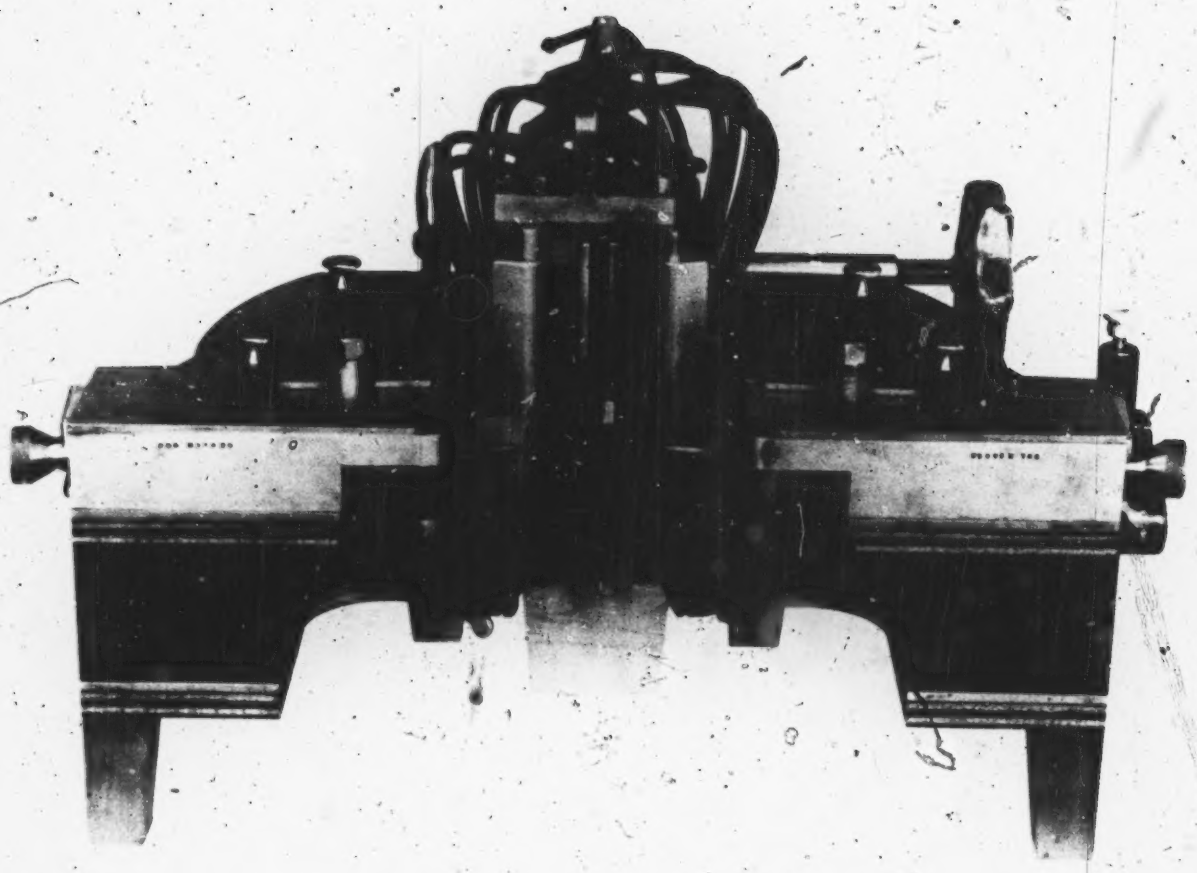
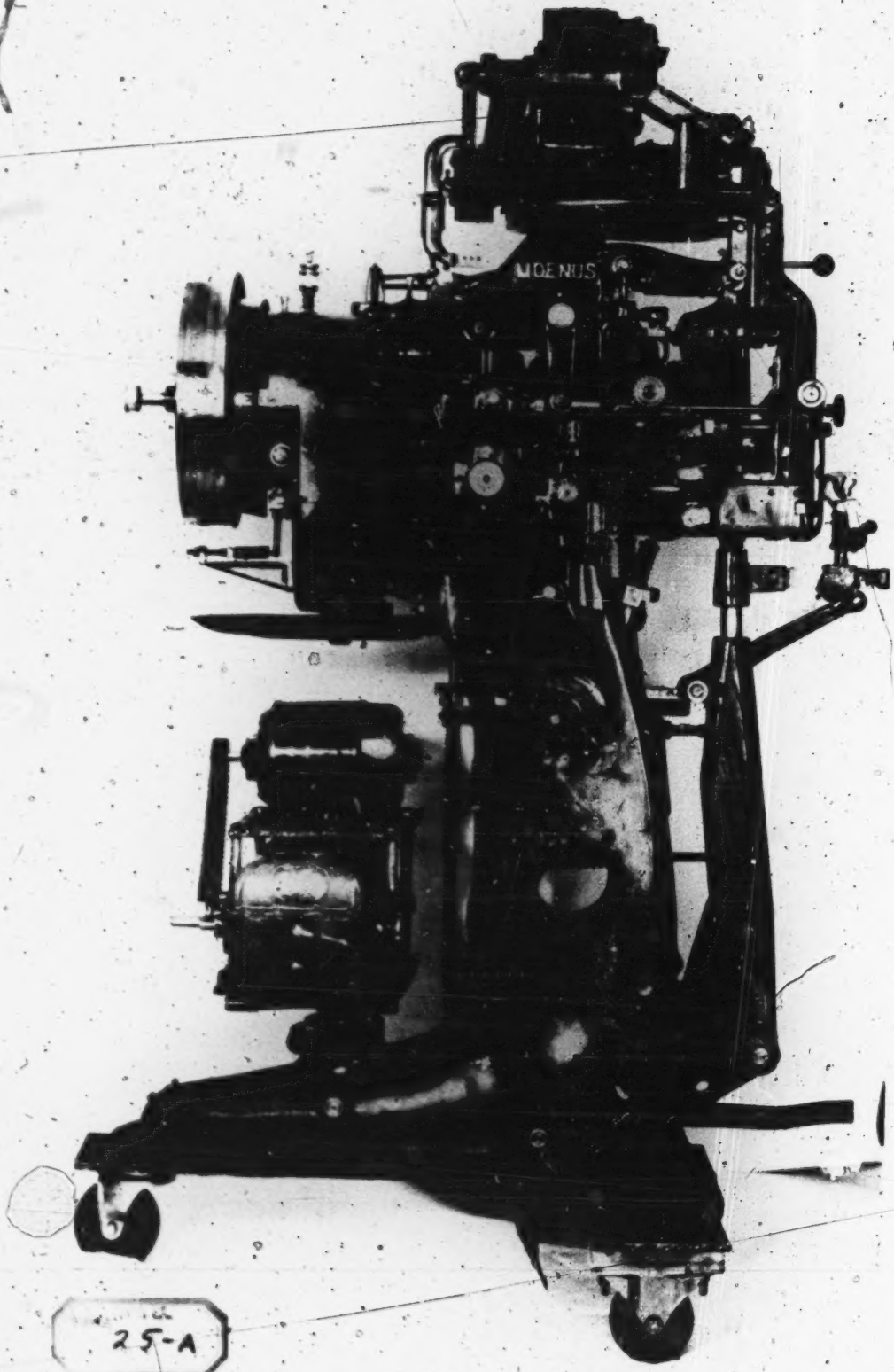
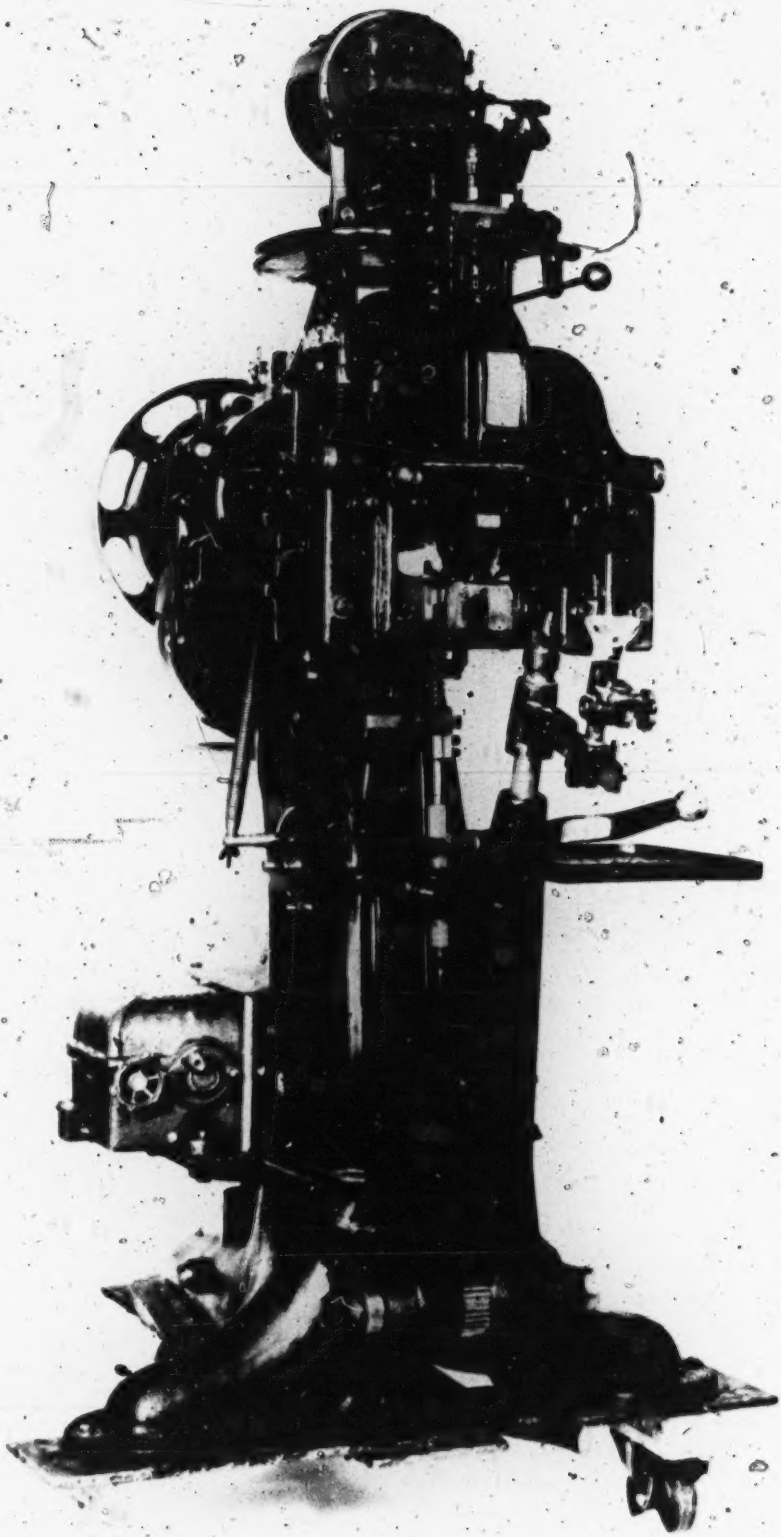


Plate PLATE'S NO. 23-F

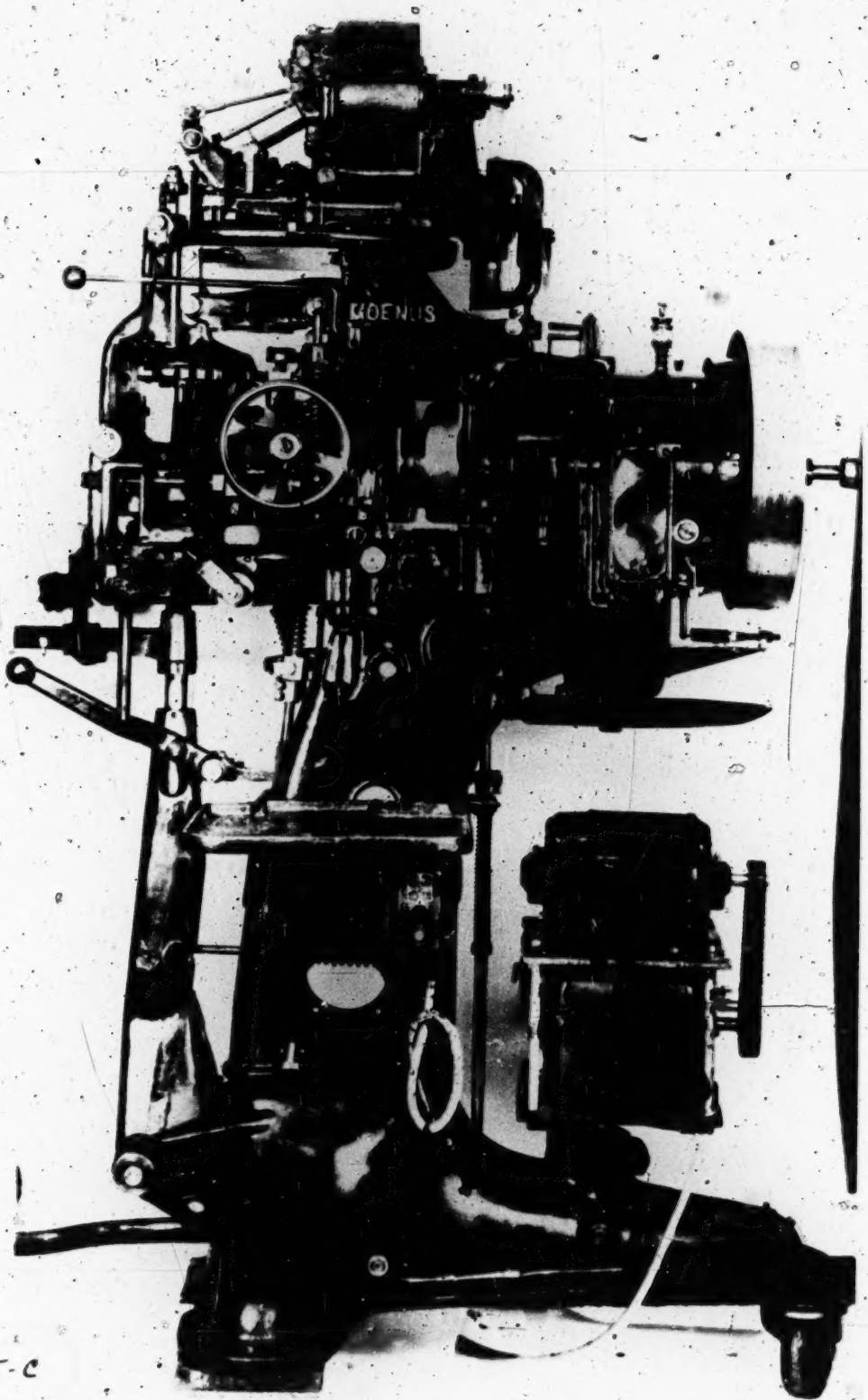


Pl. 23-G

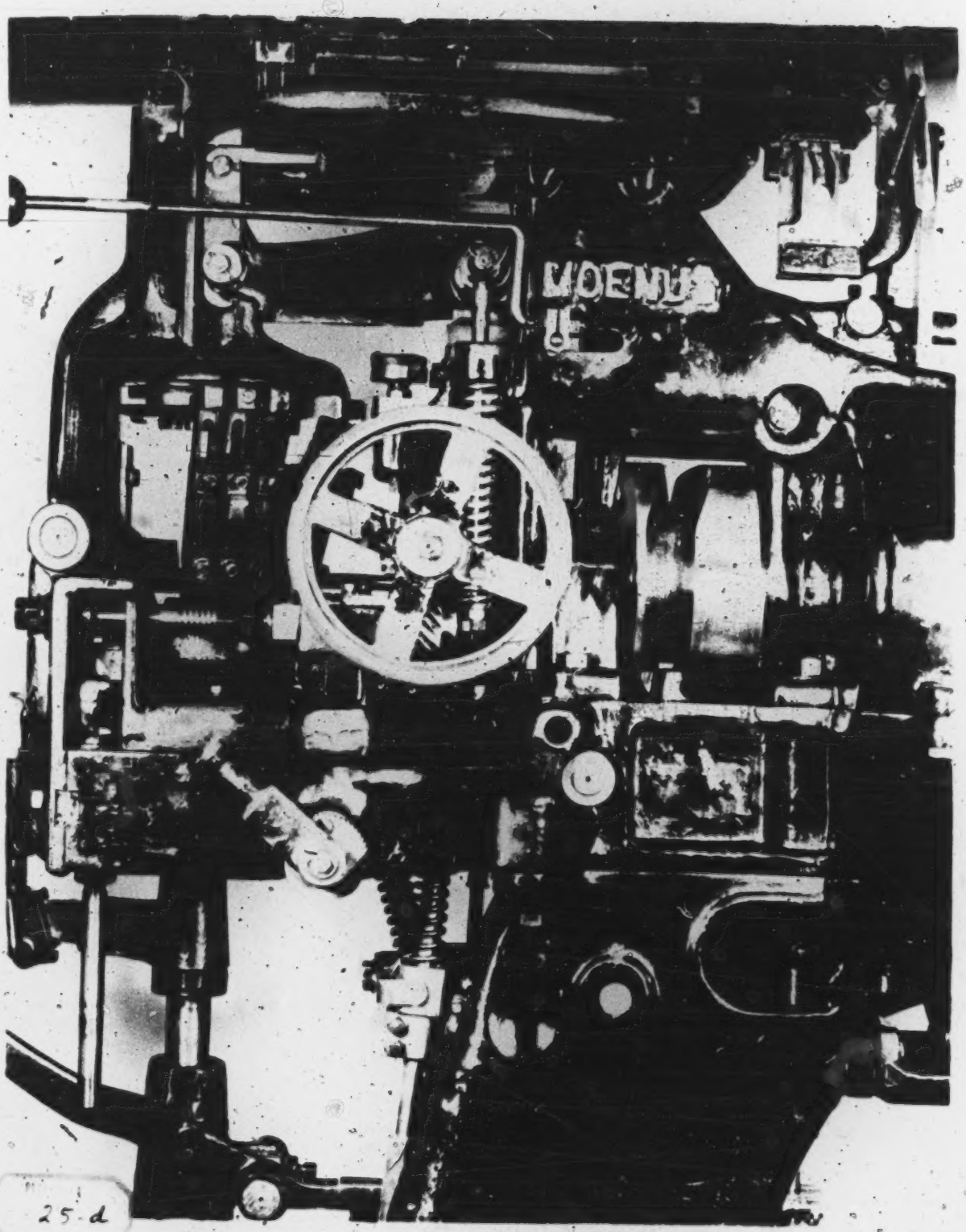

MOENUS
25-A



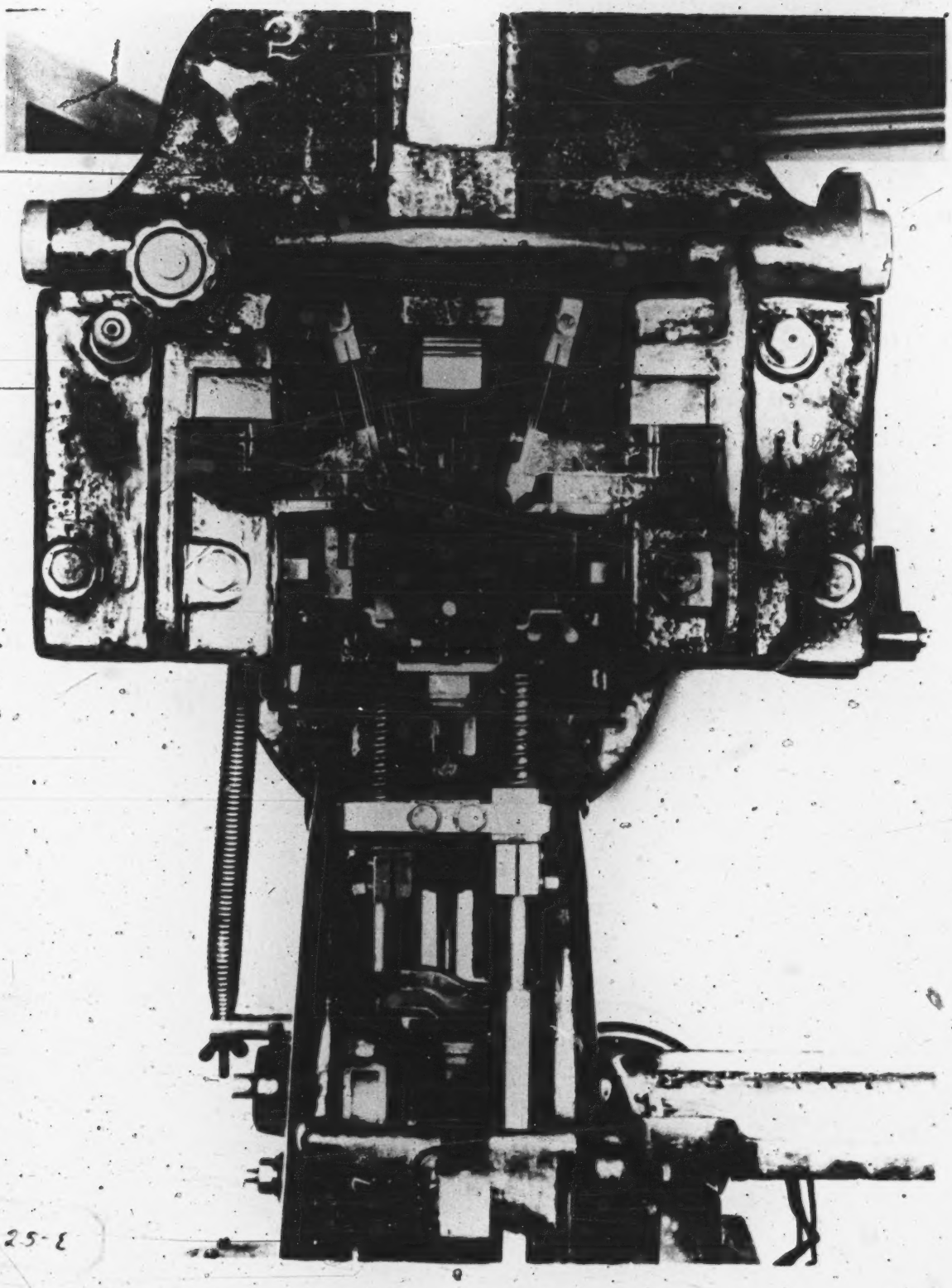
25-b



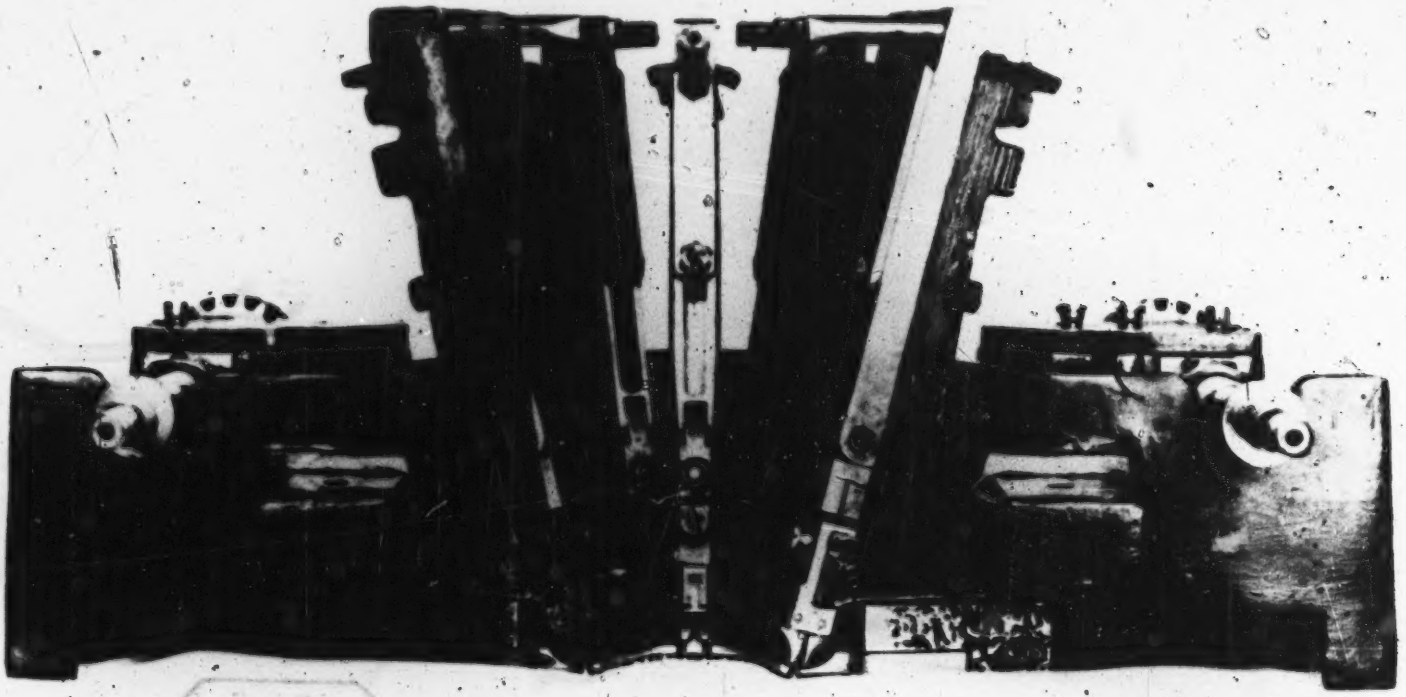
25-C



25 d



25-E



25'6

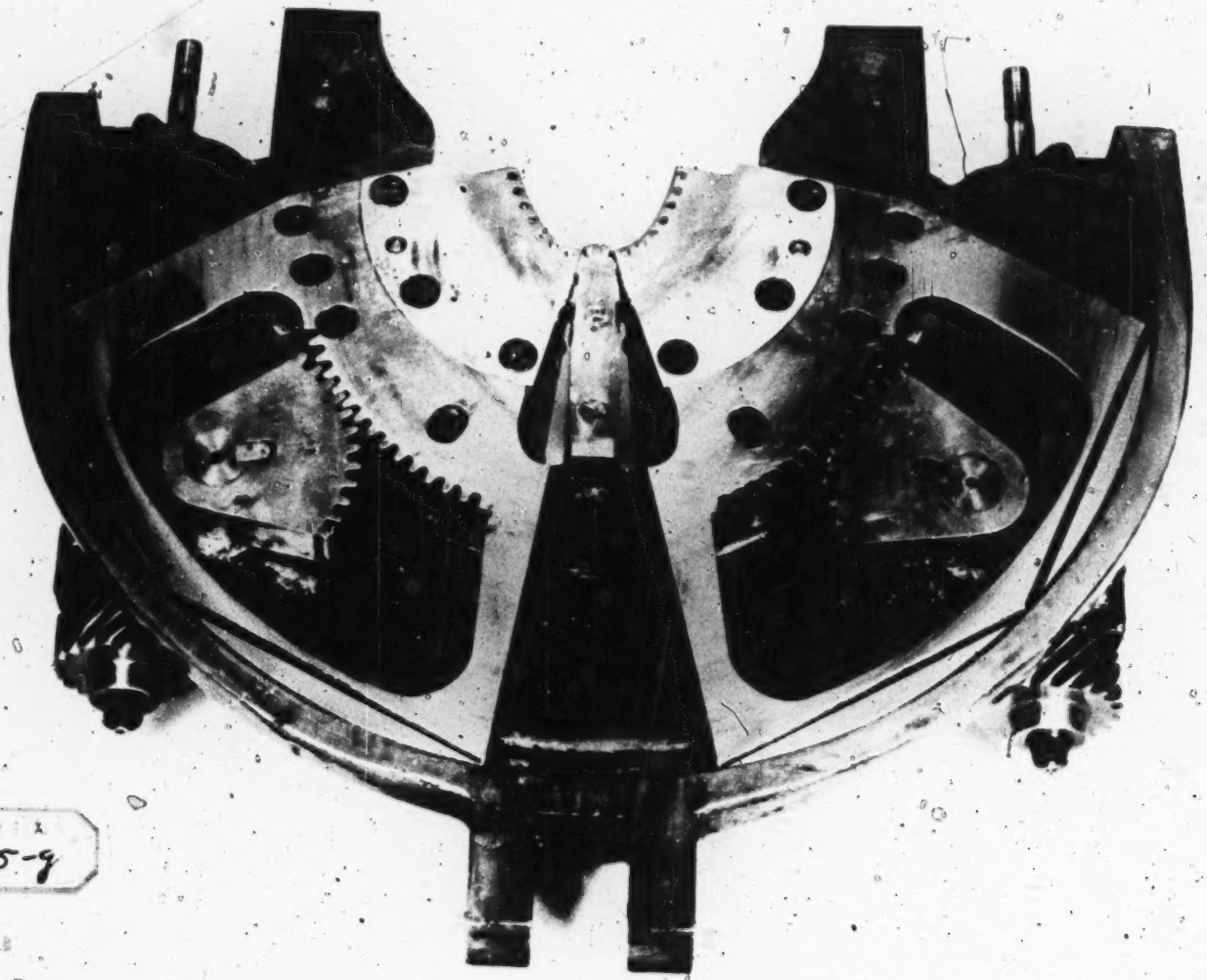
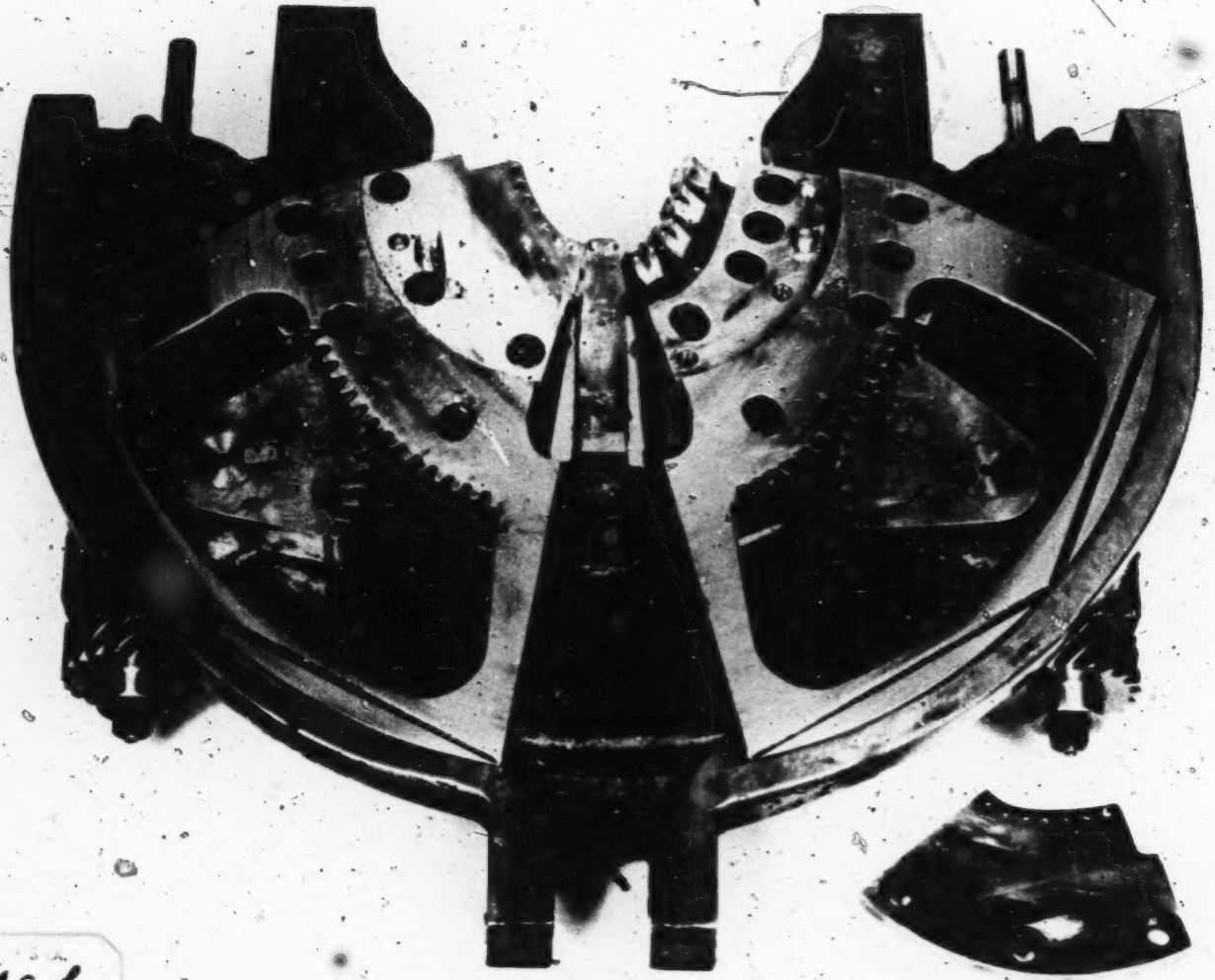


PLATE X
2:5-9

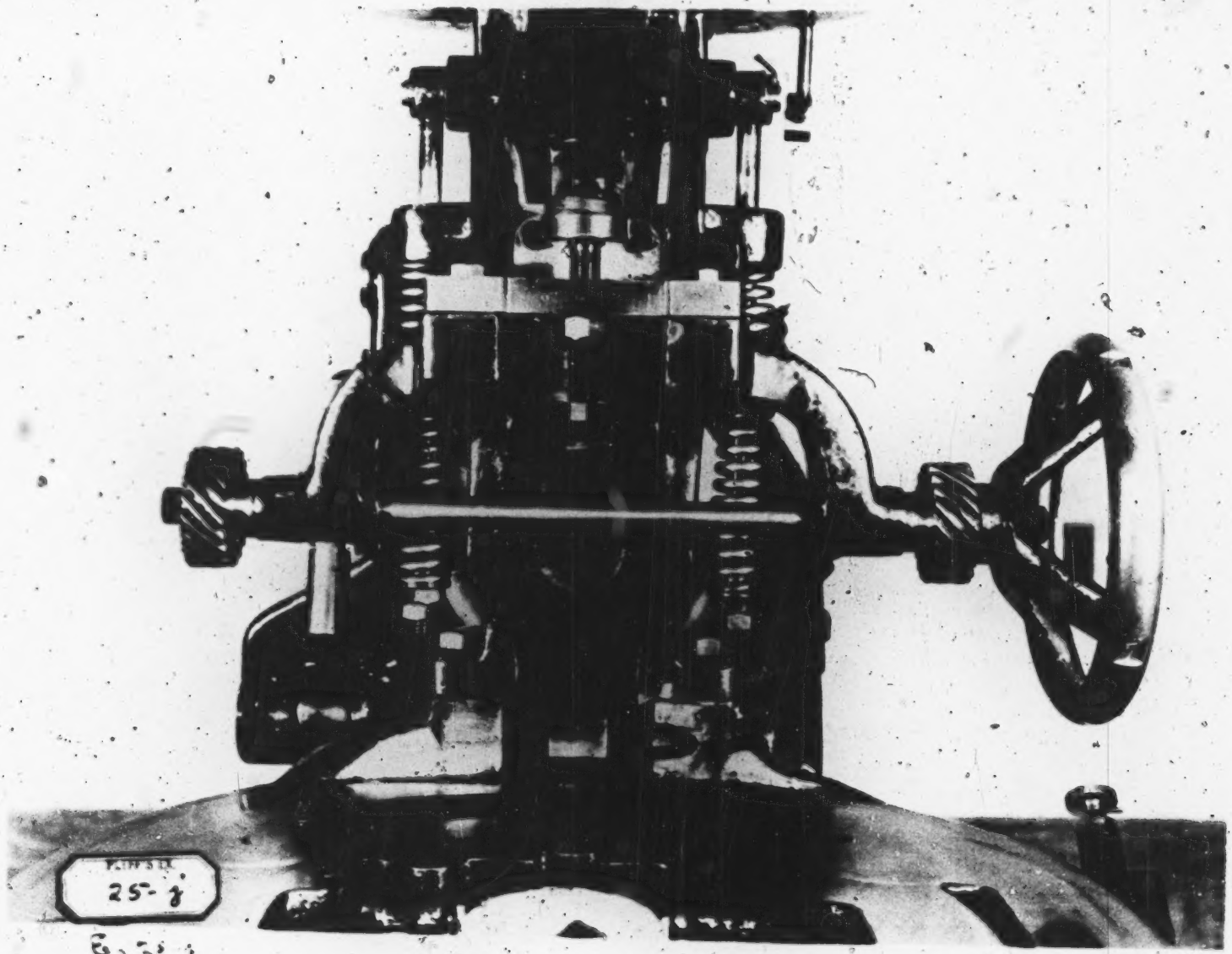
Ex 259

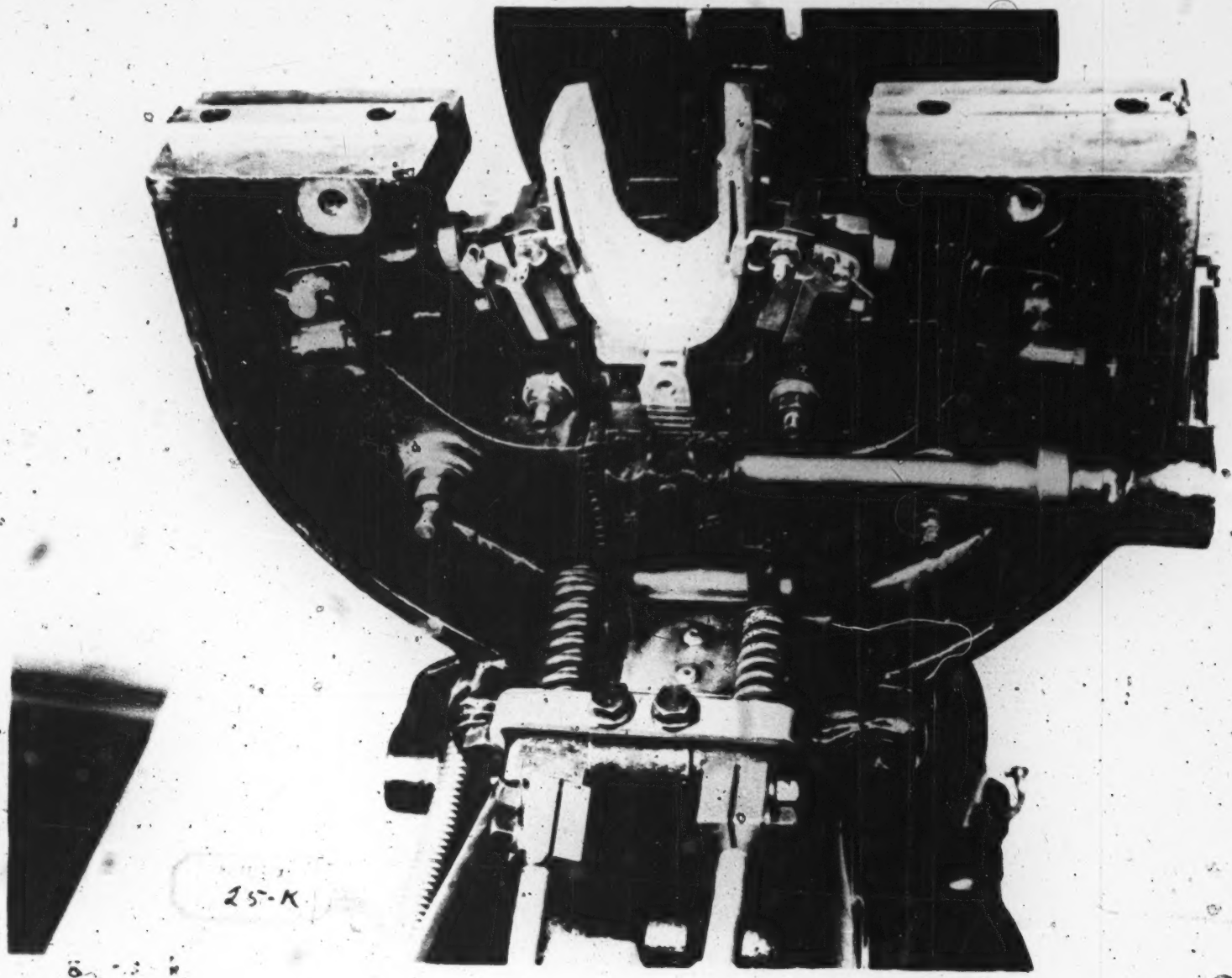
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25-2

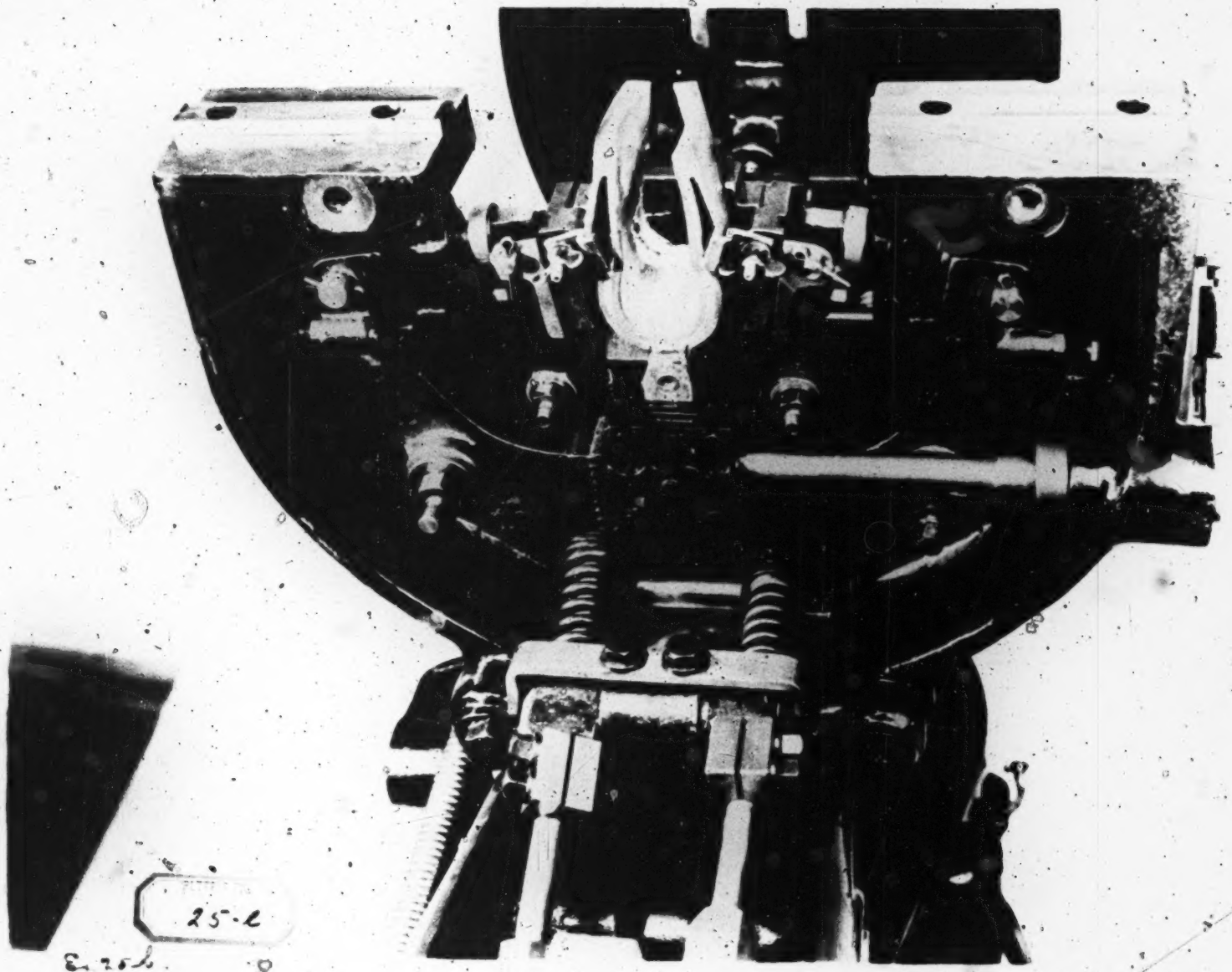
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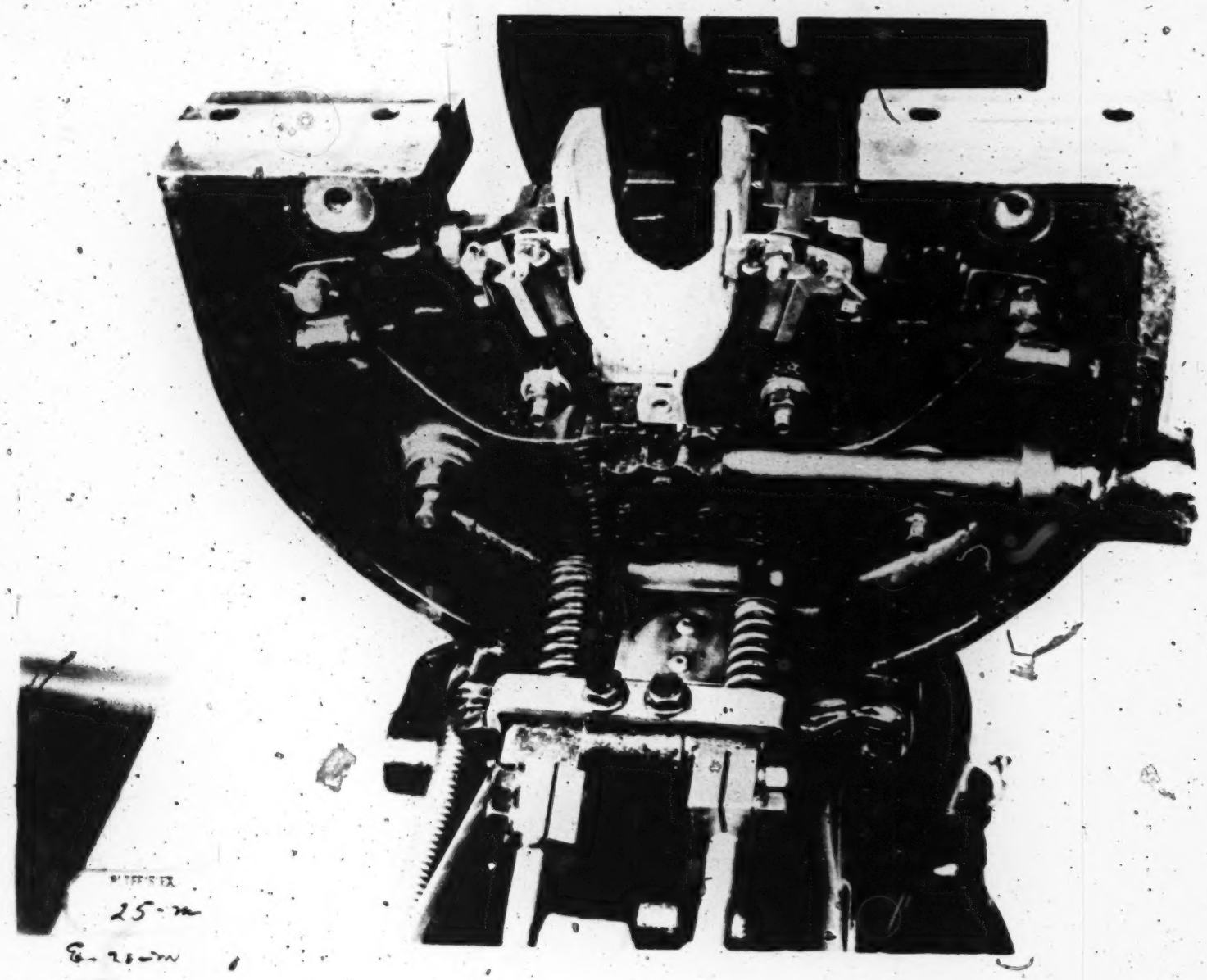




25-K

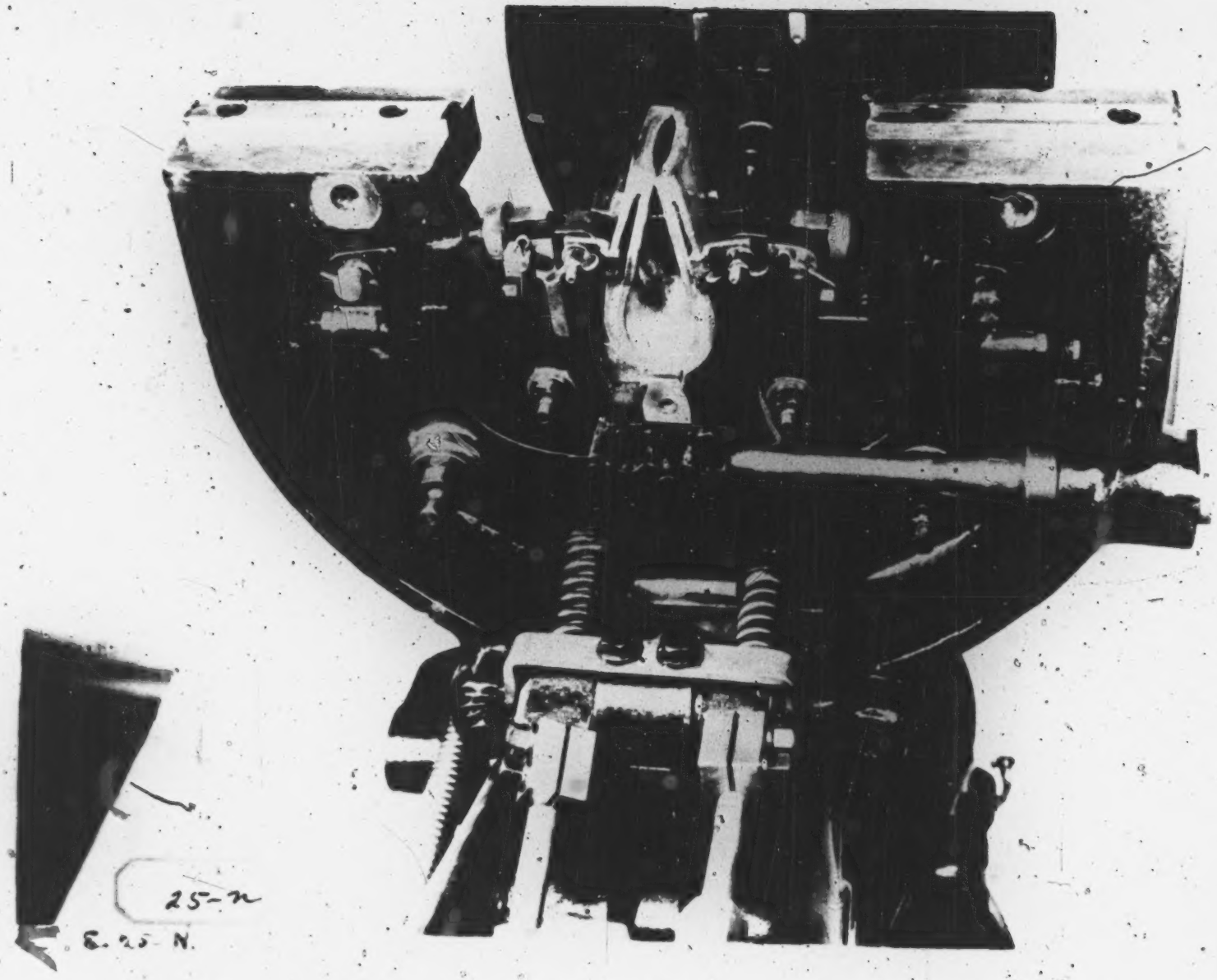
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25-L



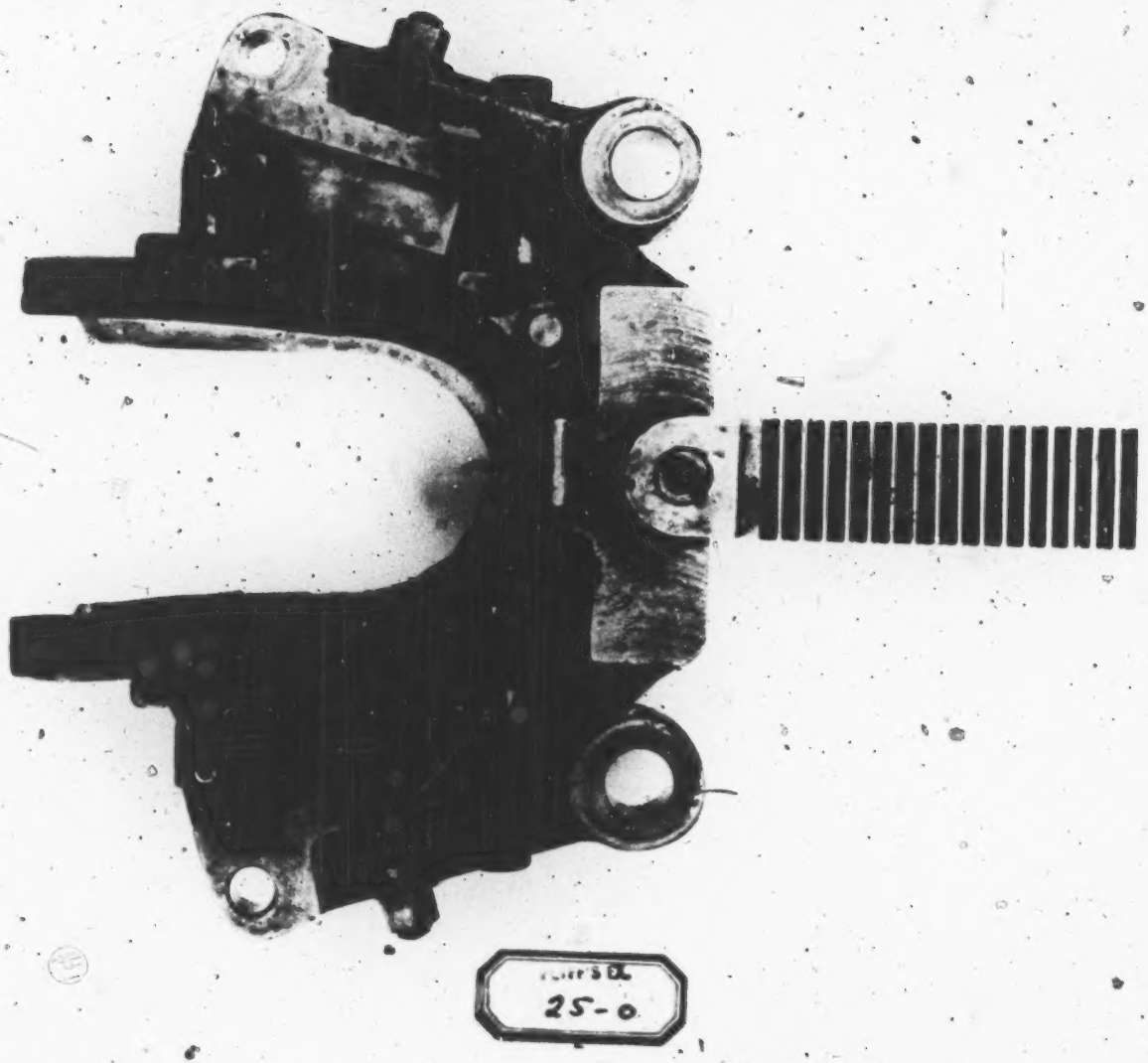
25-m

E-25-m



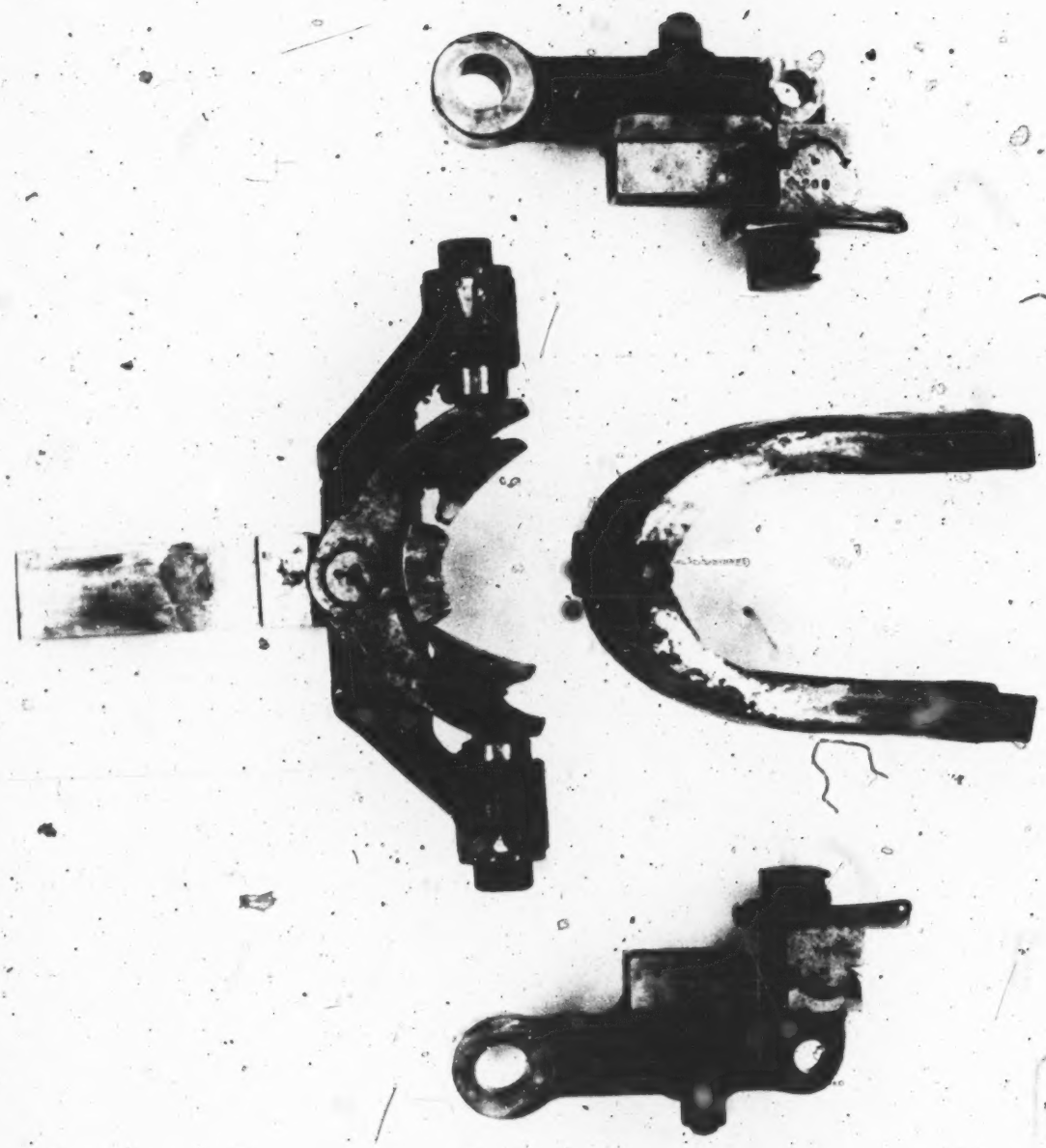
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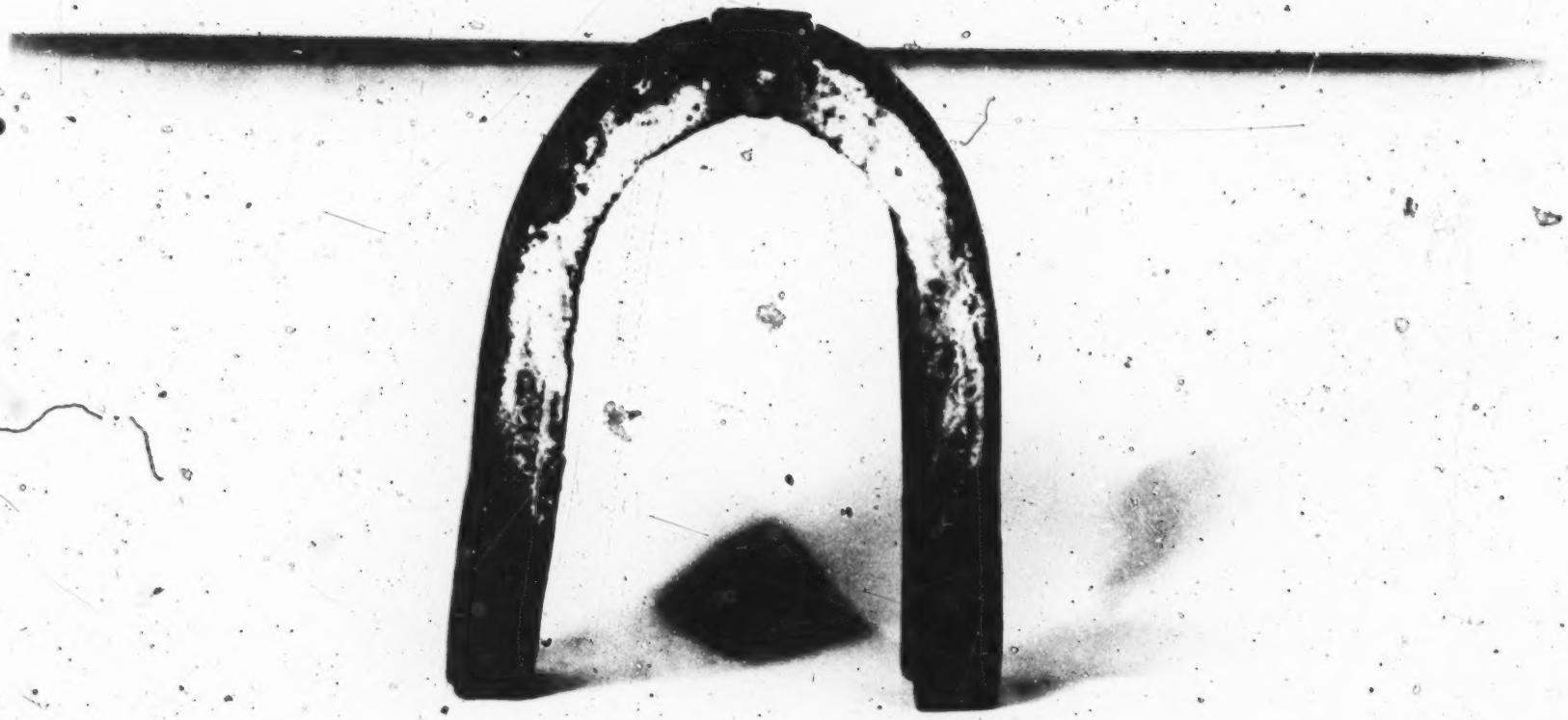
E. 25 N.



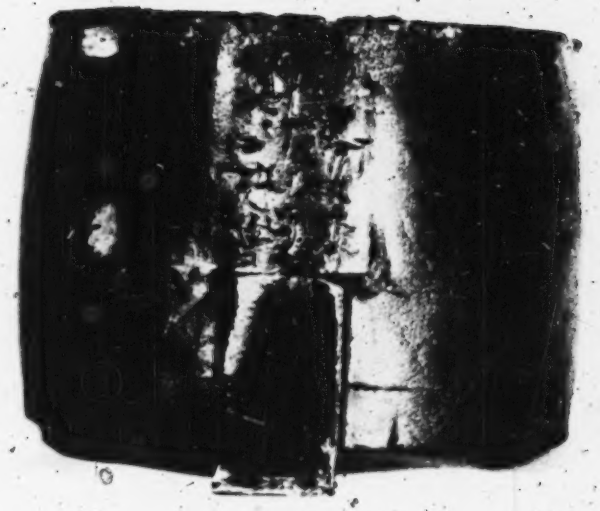
25-0

Ex 25-0





25-8



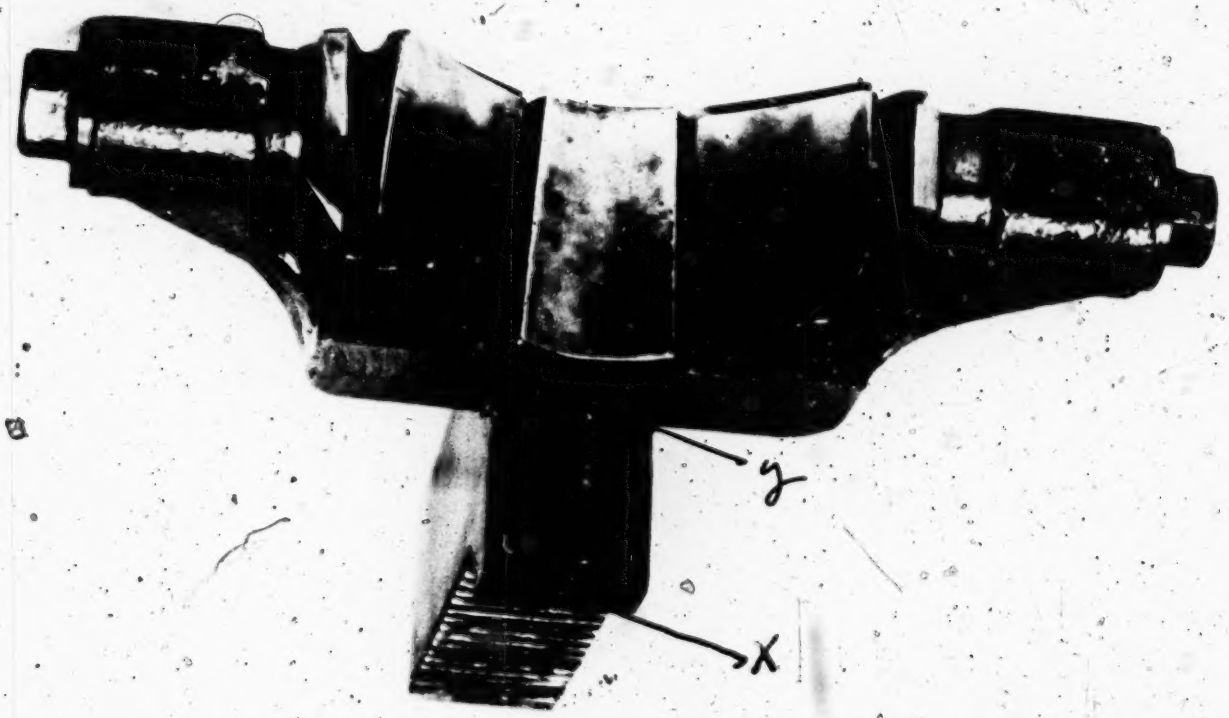
2.5-h



25-5



25-t



25-11

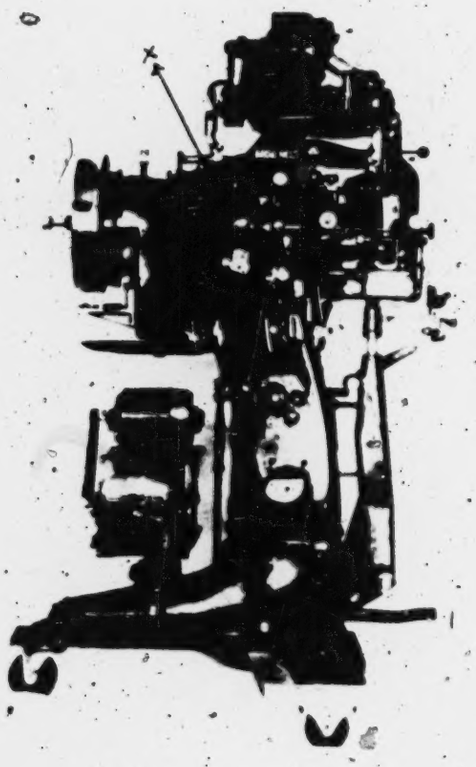
45-V

A

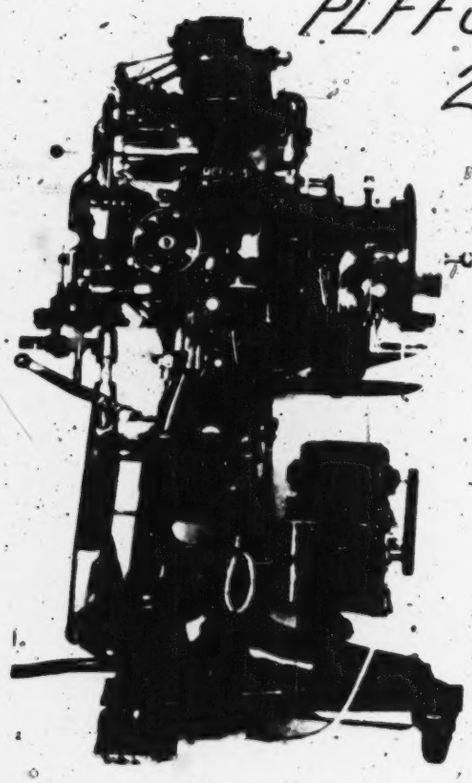
GENERAL VIEWS OF MACHINE

B

PLFFS. EX. 29

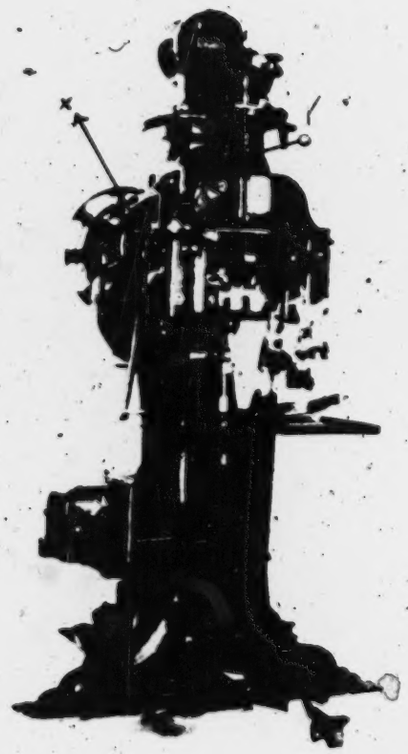


LEFT SIDE ELEVATION



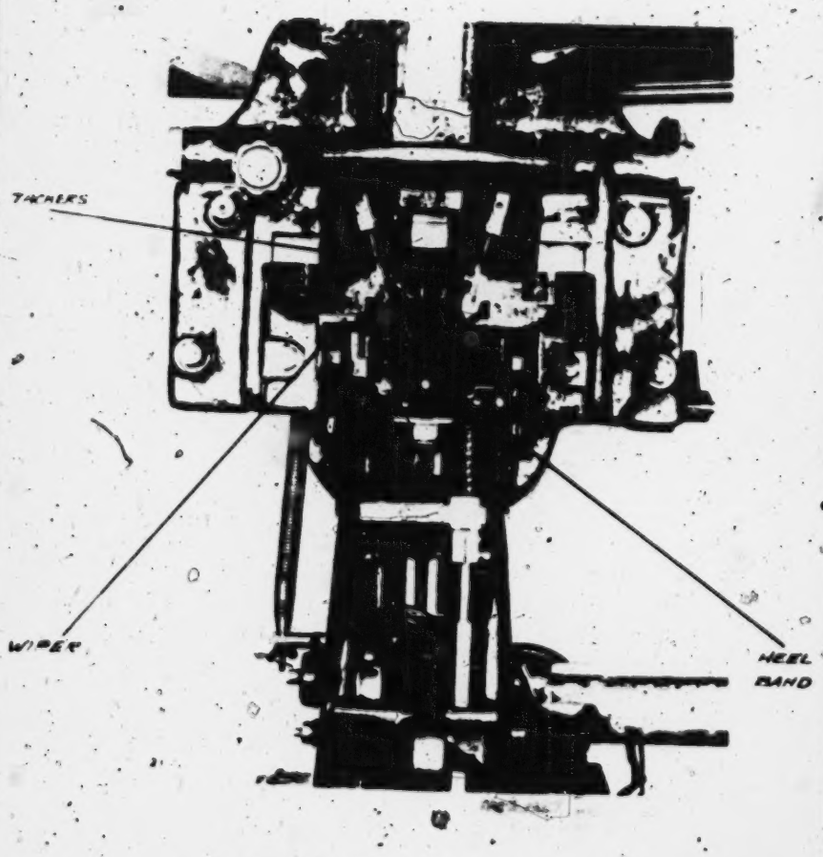
RIGHT SIDE ELEVATION

C



FRONT ELEVATION

D

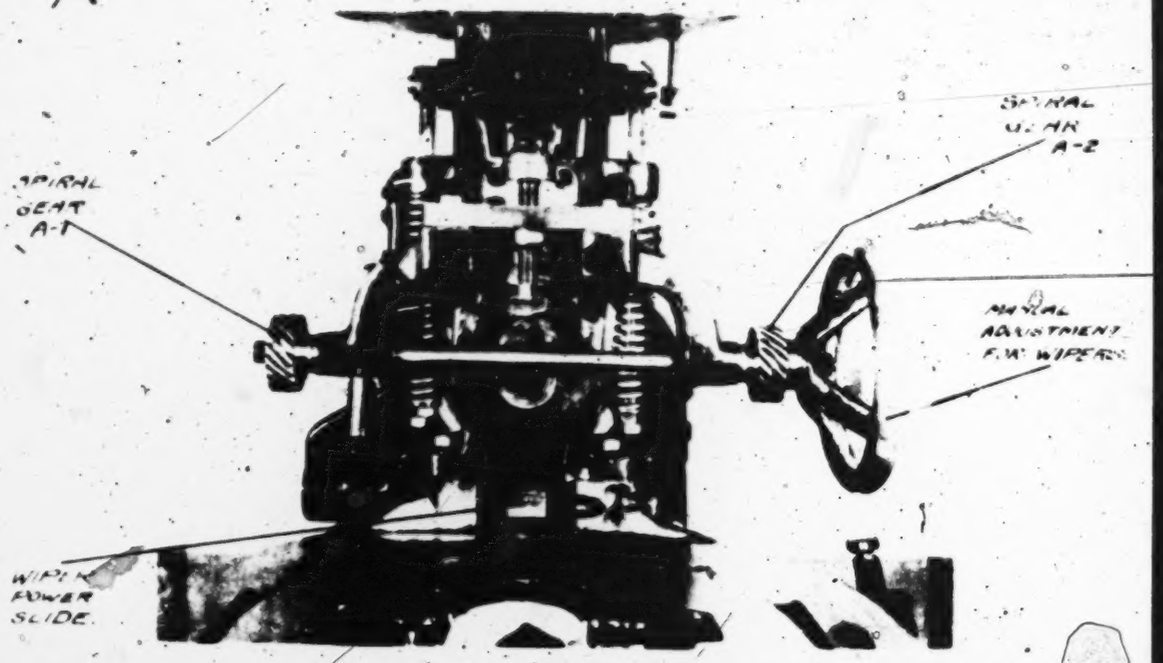


FRONT DETAIL

WIPER-TACKER MECHANISM

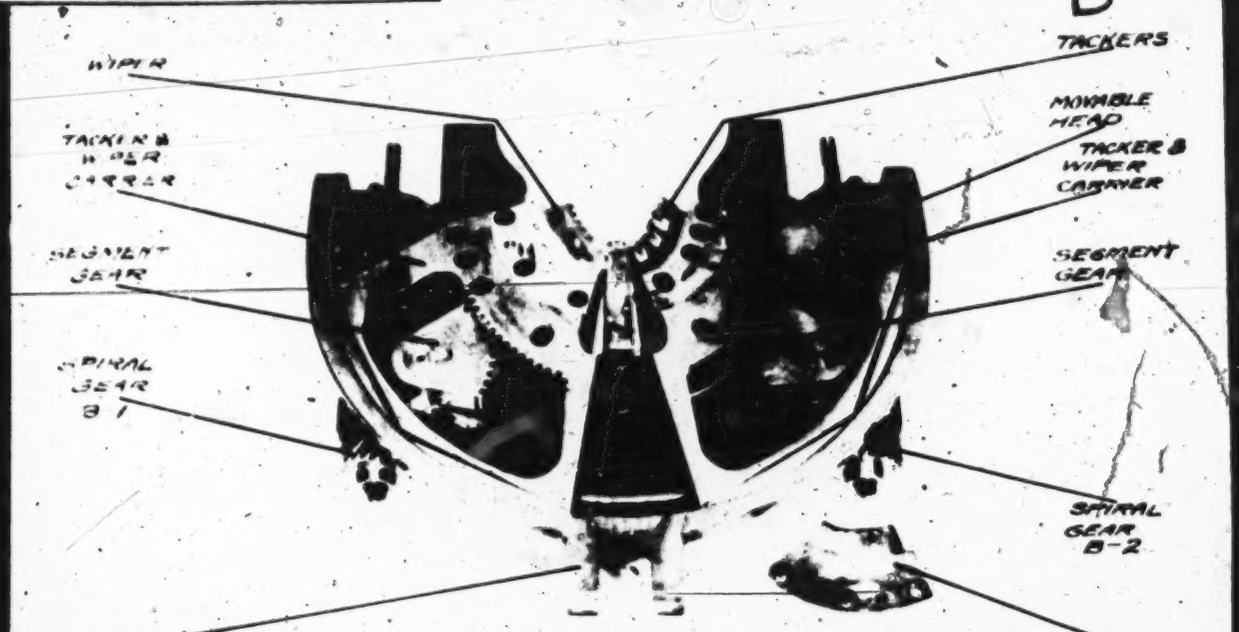
PLFFS. EX. 30

A



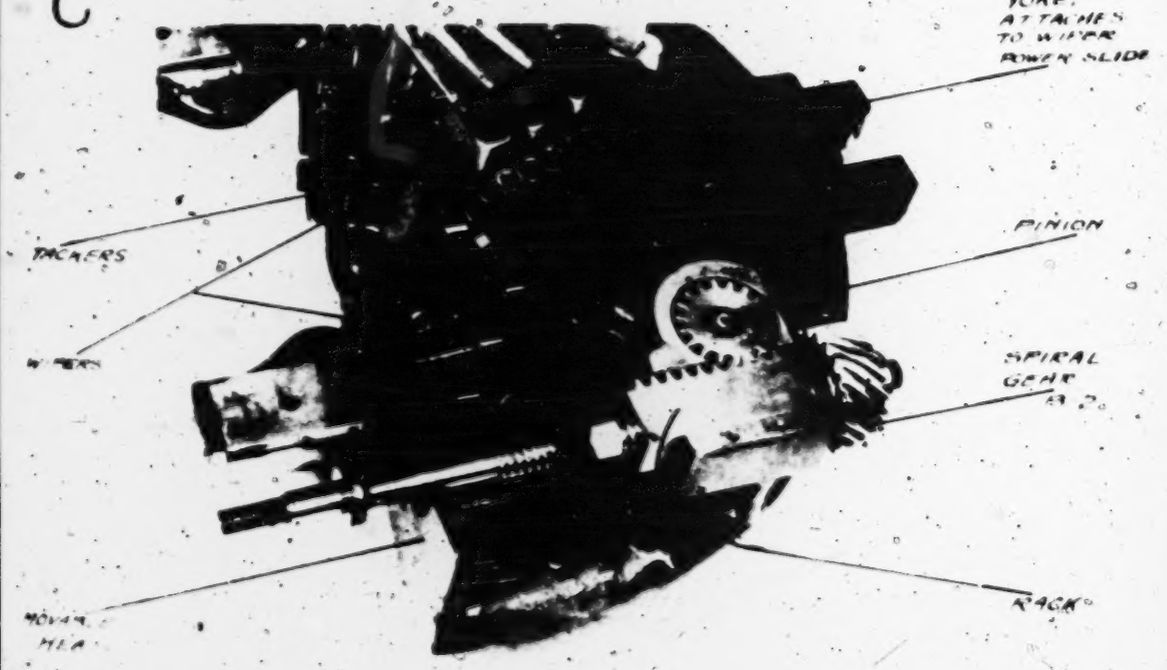
FRONT ELEVATION

B



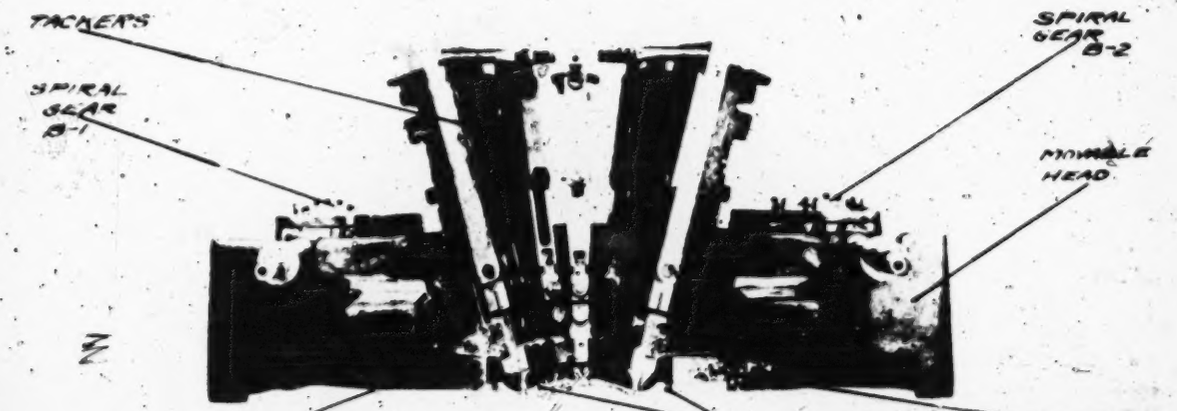
BOTTOM VIEW

C



TOP VIEW

D

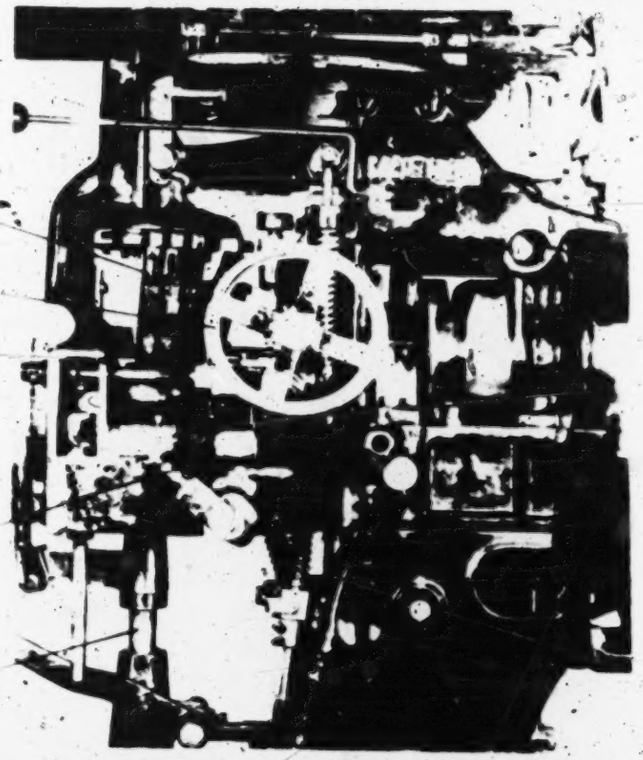


FRONT ELEVATION

HEEL BAND ADJUSTING MECHANISM

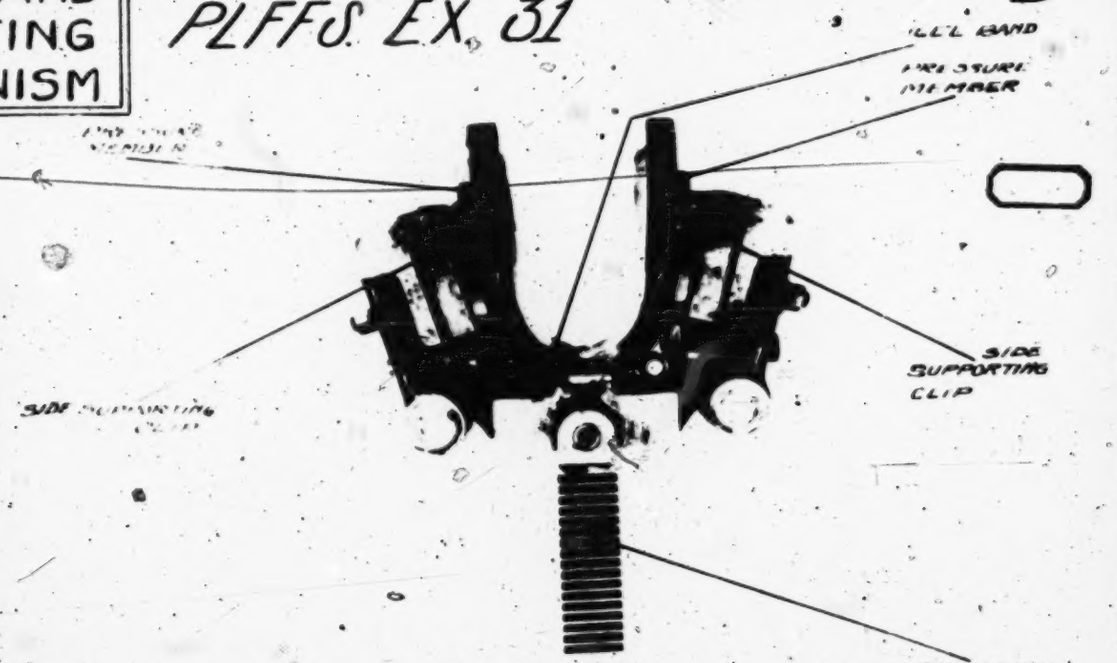
PLFFS. EX. 31

A



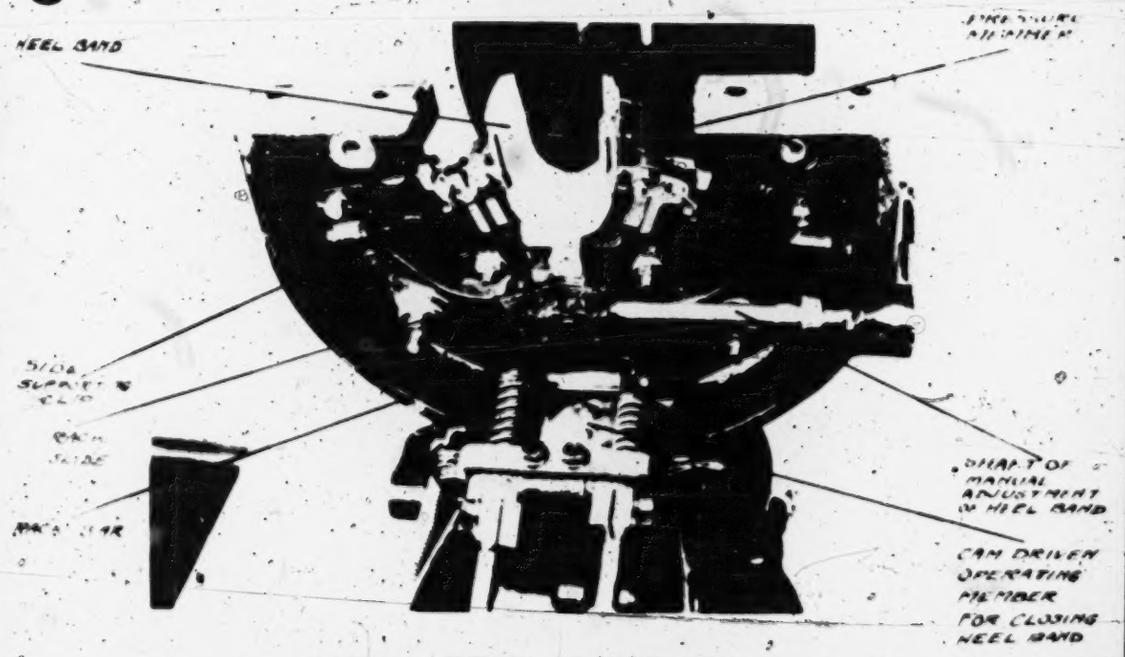
RIGHT SIDE ELEVATION

B



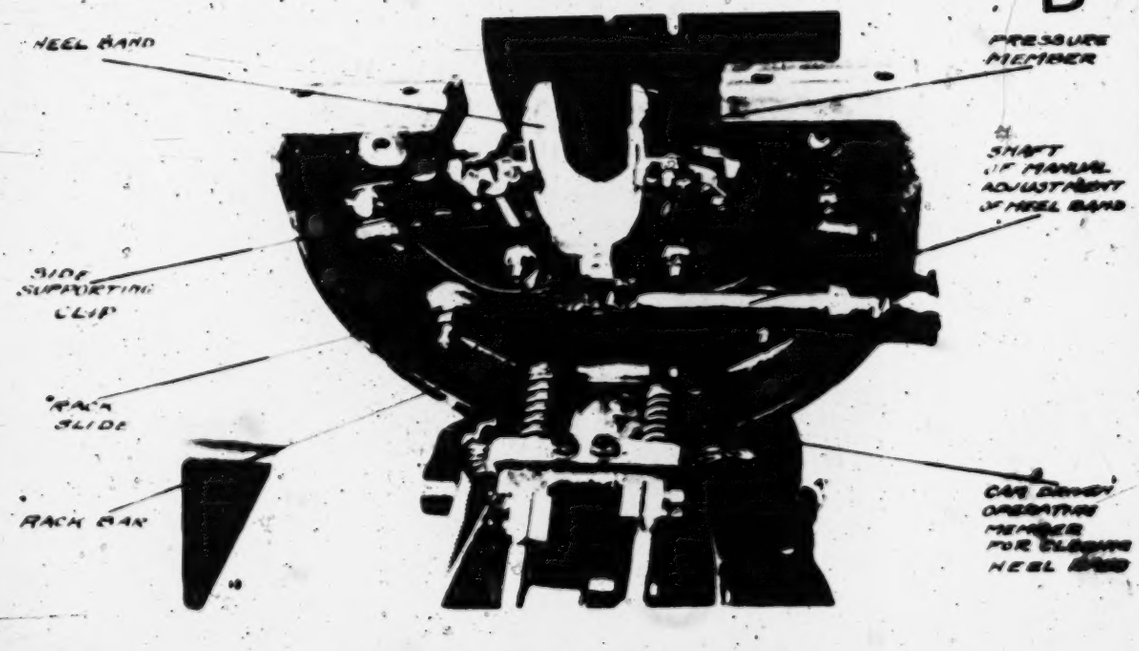
BOTTOM PLAN VIEW

C



VIEW FROM BENEATH

D

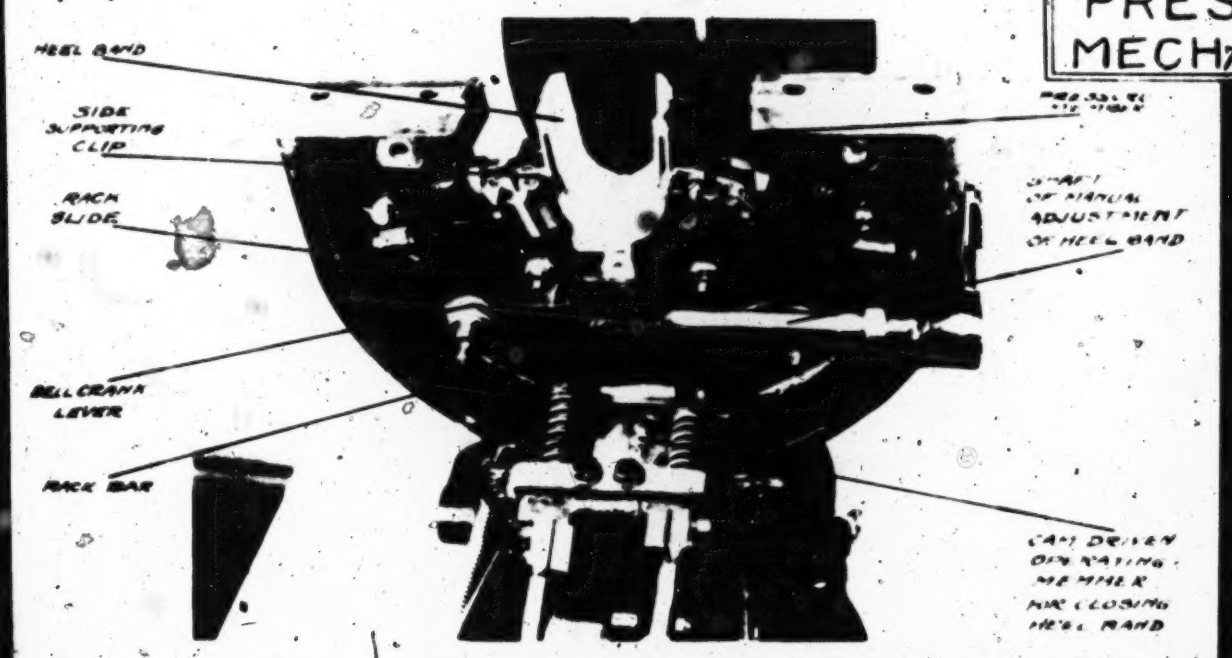


VIEW FROM BENEATH

HEEL BAND PRESSURE MECHANISM

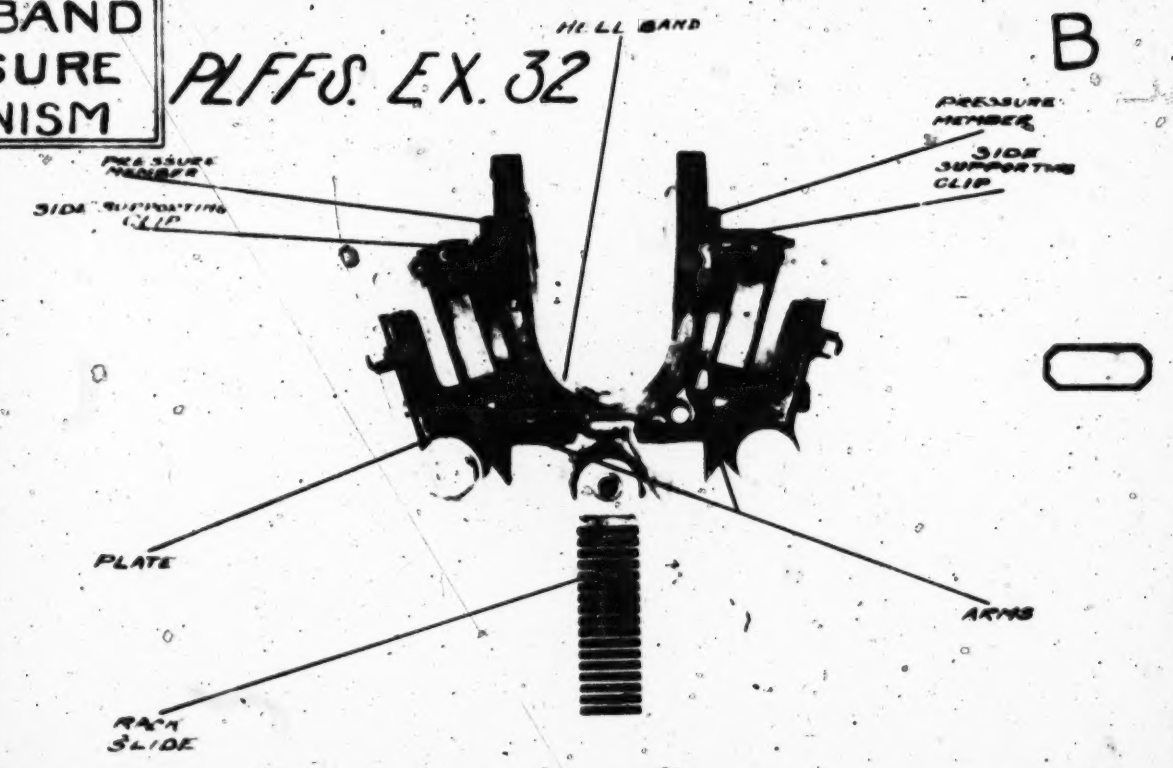
PLFFS. EX. 32

A



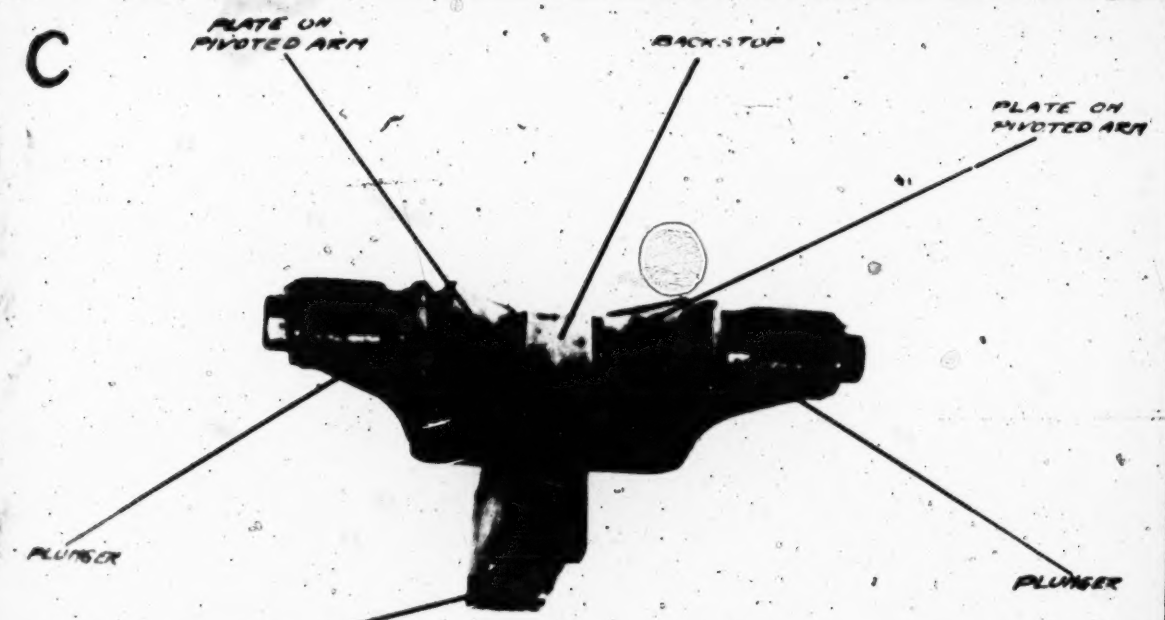
VIEW FROM BENEATH

B



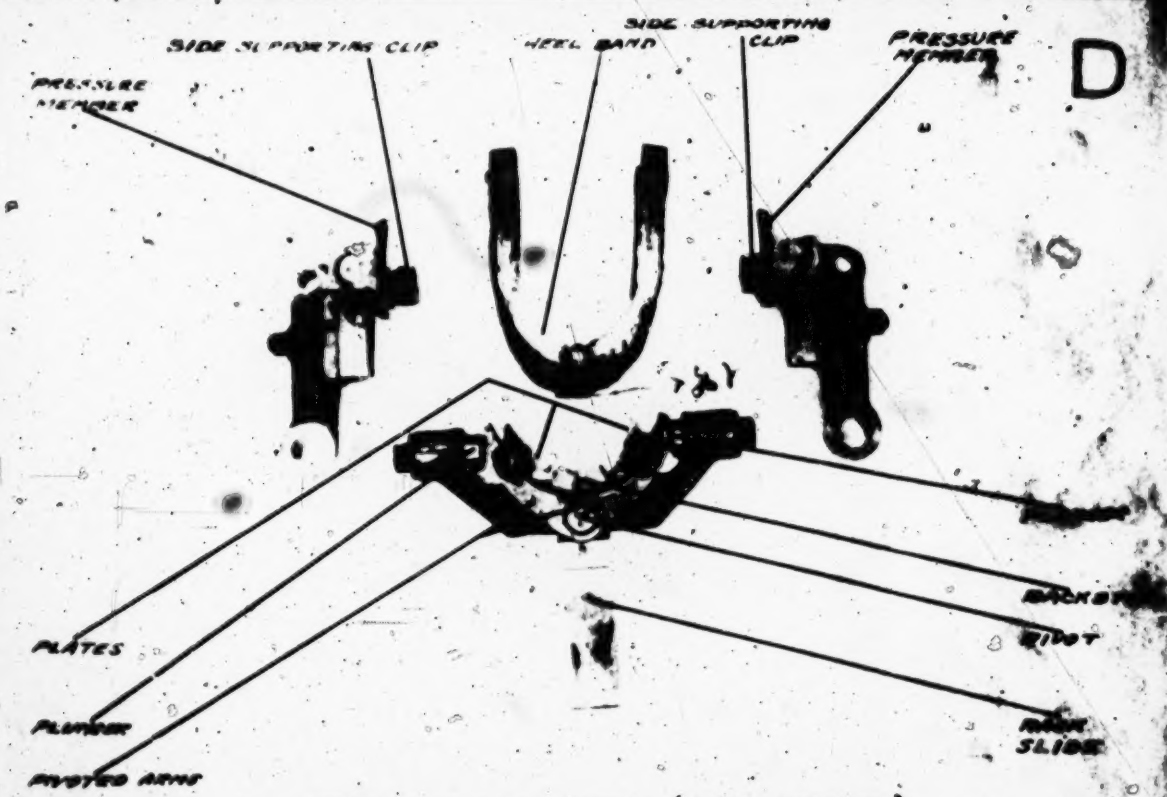
BOTTOM PLAN VIEW

C



VIEW FROM BENEATH

D



TOP PLAN VIEW (EXPLODED)

April 5, 1932. J. C. JORGENSEN 1,852,015

MACHINE FOR SHAPING SHOE UPPERS

Filed April 16, 1929 3 Sheets-Sheet 1

Fig.1.

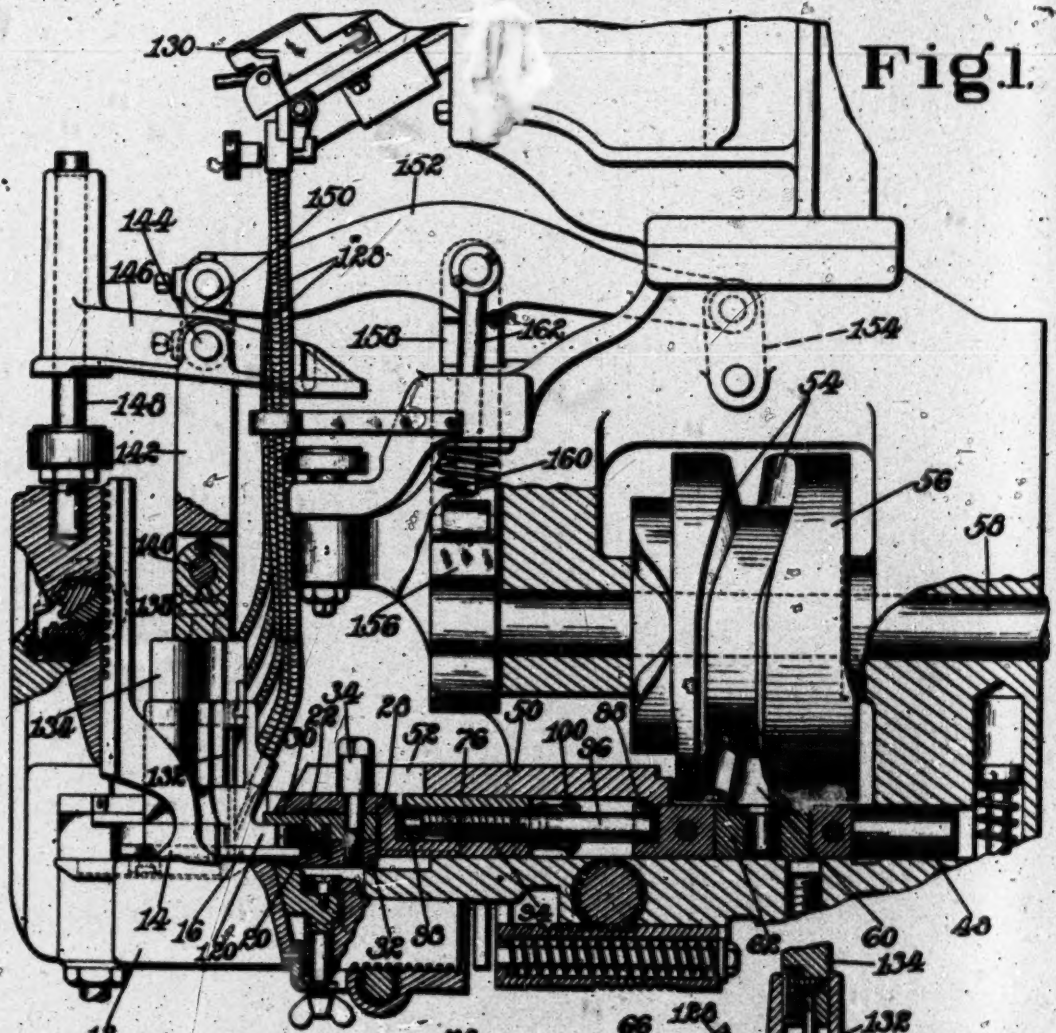
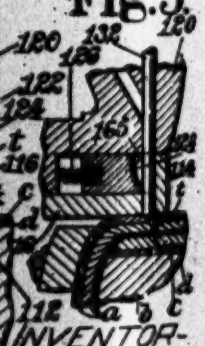


Fig.3.



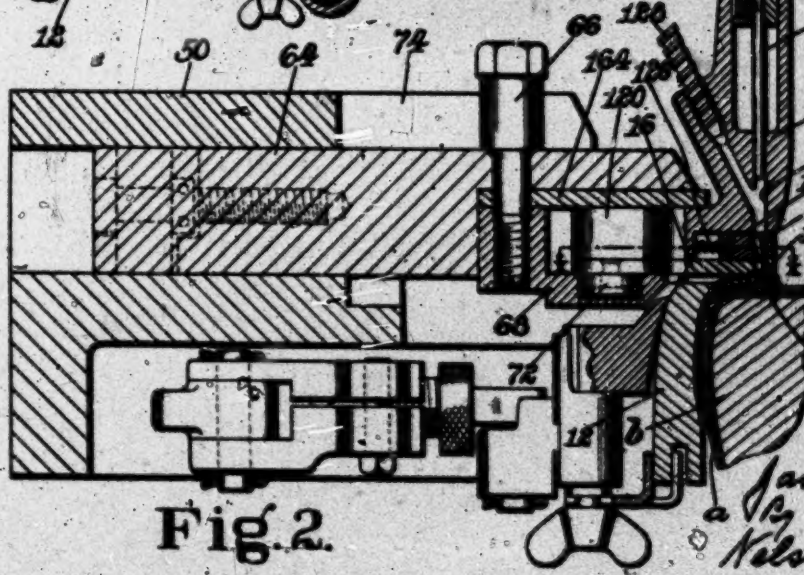
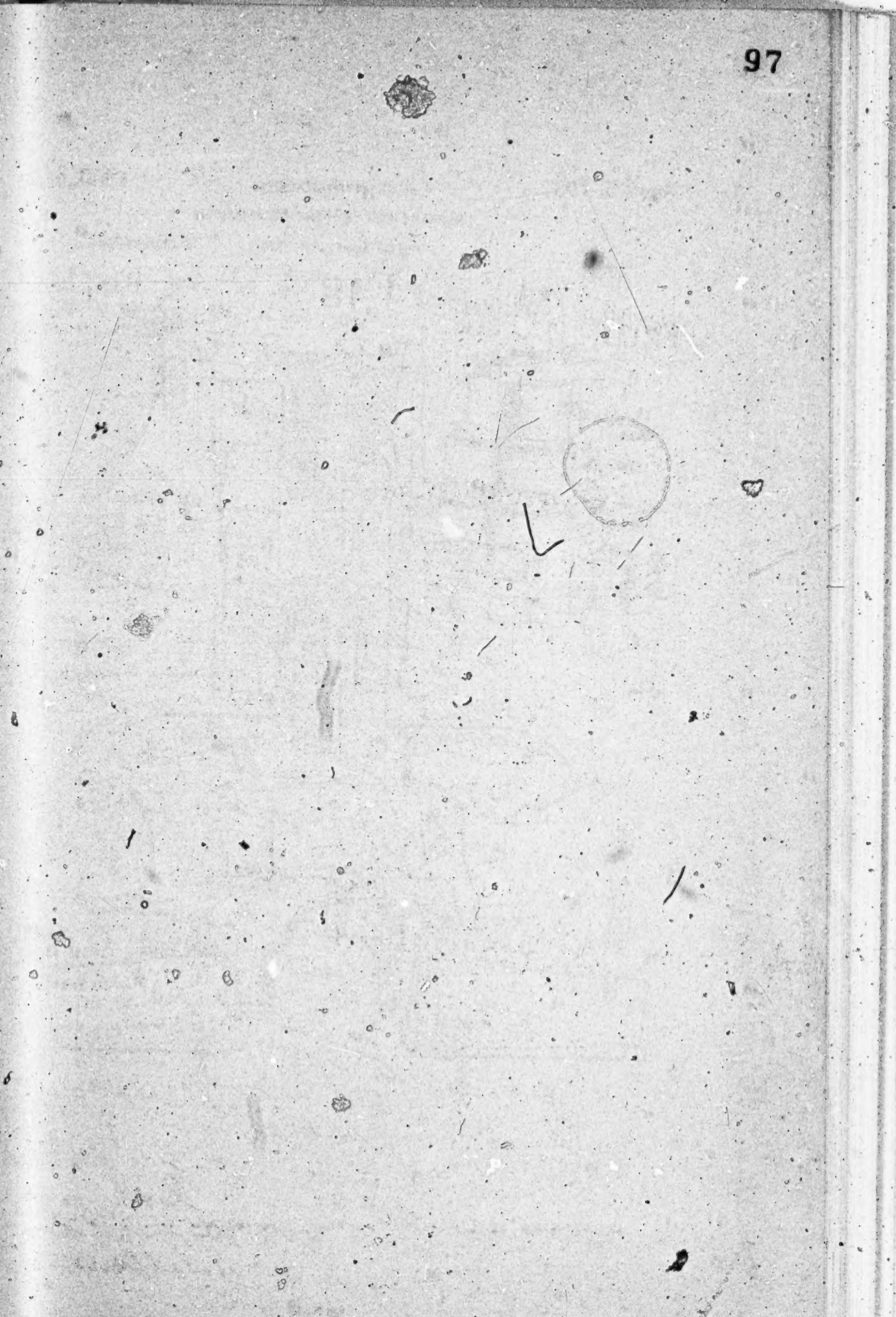


Fig.2.



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Fig.4.

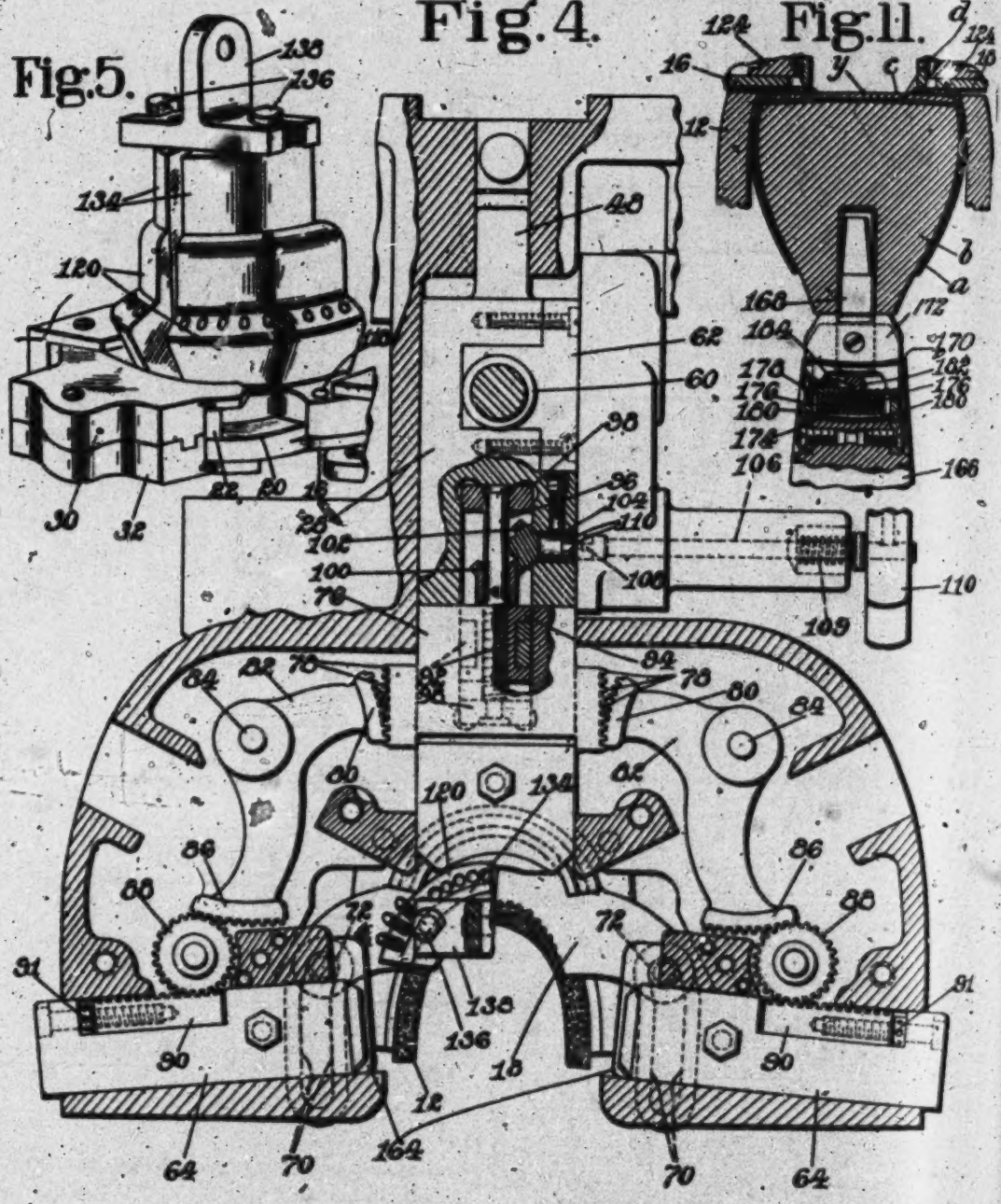


Fig.5.

Fig.11.

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Fig.8.

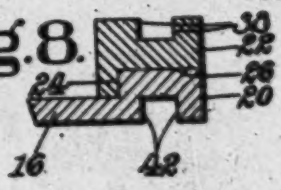


Fig.9.

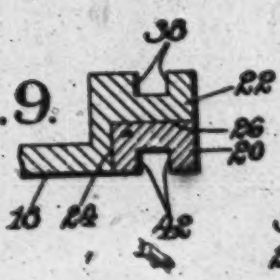


Fig.7.

Fig.6.

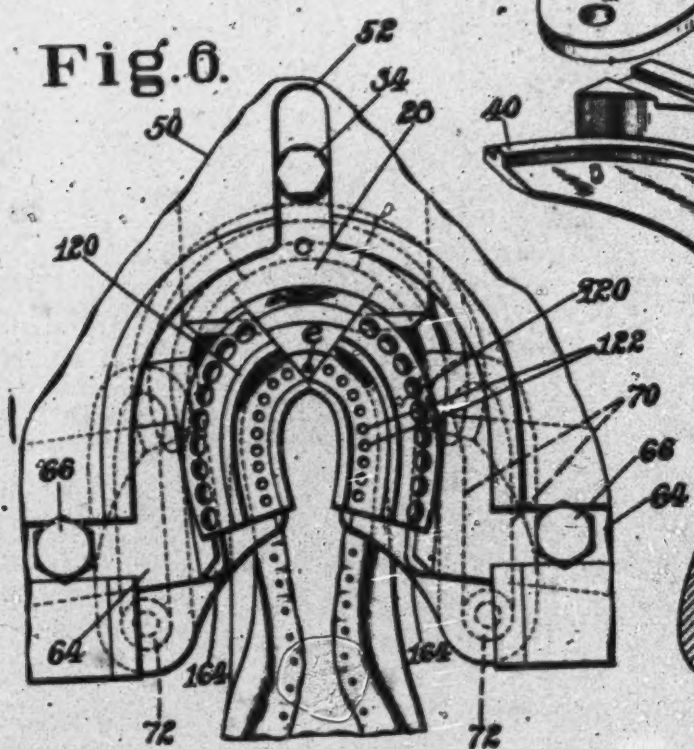
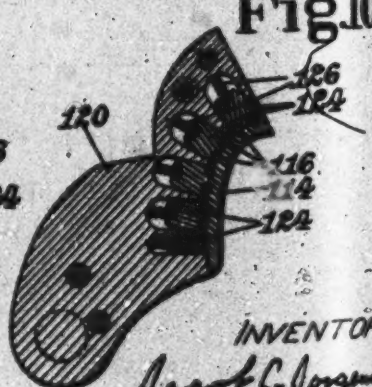




Fig.10



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UNITED STATES PATENT OFFICE

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MACHINE FOR SHAPING SHOE UPPERS

Application filed April 16, 1928. Serial No. 365,686.

This invention relates to machines for use in the manufacture of shoes for shaping uppers over lasts or other forms. The invention is herein illustrated as embodied in a machine for lasting the heel ends of shoes, but it is to be understood that in its more general aspects it is not limited to heel-end-lasting machines.

For shaping the heel ends of shoe uppers there have been provided heretofore machines having wipers for wiping the margin of the heel end of an upper inwardly over a shoe bottom part, such as a sole or insole, mounted on a last or other form, and means for driving a plurality of permanent fastenings, such as tacks, to secure the margin of the upper in overwiped position. An object of the present invention, in one important aspect, is to provide improvements in an organization of that general character, including end-wiping means and fastening means, and more particularly to provide a construction such that the upper will be fastened more tightly and smoothly than heretofore and with more satisfactory results in operating on shoes of different sizes. With this general object in view, the machine herein shown is so constructed that the fastenings are driven through openings in the wipers, so that the upper may be fastened without retracting the wipers from their innermost wiping position, and are driven, moreover, in invariably spaced relation to one another at each side of the heel seat in operating on shoes of different sizes. For driving the fastenings in this manner each of the wipers in the construction illustrated carries with it in its movement over the shoe a gang of drivers mounted in fixed parallel relation to one another and movable as a unit in a direction substantially perpendicular to the plane of the wipers to drive the fastenings, such an organization of wipers and drivers being regarded as the most satisfactory from the point of view of simplicity and compactness of structure and facility of operation of the driving means. It is, however, very desirable that the upper-securing fastenings be driven in directions inclined inwardly away from the edge of the shoe bottom, especially in view of the fact that the heel seat of a shoe is usually somewhat convex, in order to insure that the fastenings as they are driven will have no loosening effect on the upper but will rather tend to draw its margin more tightly inward over the shoe bottom. The machine herein shown is accordingly further so constructed that while the drivers are movable, as above explained, in directions substantially perpendicular to the plane of the wipers, the fastenings are driven in inwardly inclined directions. As herein illustrated the fastenings utilized are tacks, and for the purpose in view the tacks are so positioned as to incline them inwardly in the desired directions relatively to the drivers, the latter also being so formed as to present end faces inclined in substantially parallel relations to the heads of the inclined tacks to assist in maintaining the inclinations of the tacks. The tacks as they are driven are thus all inclined inwardly away from the edge of the shoe bottom in various angular relations to one another by the action of the parallel drivers.

While the machine herein shown thus comprises an organization whereby fastenings, inserted at inclinations such as described by the action of drivers movable perpendicularly to the plane of the wipers, are driven through openings in the wipers, it is considered that in some of its novel and useful aspects the invention is not limited to a construction in which the fastenings are driven through the wipers; and it is further considered that in various aspects the invention is not limited in utility to an organization in which the fastening means is carried by the wipers.

In addition to features involving the driving of fastenings in inwardly inclined directions, as above set forth, features of novelty are also to be recognized in other aspects of the illustrated combination of wiping and fastening means; and the invention still further provides improvements in end wiper mechanism, relating particularly to means for guiding the wipers in their operative movements.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described by reference

to the accompanying drawings and pointed out in the claims.

In the drawings,

Fig. 1 is a view, partly in side elevation and partly in vertical section, of the head portion of a machine in which the invention is embodied;

Fig. 2 is a vertical section in a plane substantially at right angles to the plane of section of Fig. 1, showing portions of the structure of the machine as positioned for the driving of the upper-fastening tacks;

Fig. 3 is a sectional view similar to a portion of Fig. 2, showing the parts as positioned at the end of the tack-driving operation;

Fig. 4 is a view, partly in plan and partly in section, illustrating more clearly the construction of the wiper-operating means;

Fig. 5 is a perspective view of a portion of the wiper and tacker mechanism;

Fig. 6 is a plan view, with portions of the structure removed, illustrating more fully the relation of the wiper and tacker mechanism to the shoe at the time of the tacking operation;

Fig. 7 shows in disassembled relation the wipers and portions of their supporting means;

Fig. 8 is a section perpendicular to the plane of the wipers, in a location indicated by the line VIII—VIII of Fig. 7;

Fig. 9 is a section perpendicular to the plane of the wipers, in a location indicated by the line IX—IX of Fig. 7;

Fig. 10 is a section on the line X—X of Fig. 2, illustrating more fully the character of the tack-positioning means; and

Fig. 11 is a view, partly in front elevation and partly in section, showing details of the shoe-supporting means.

The invention is herein illustrated as embodied in a machine of the same general type as that disclosed in United States Letters Patent No. 1,583,044, granted on May 4, 1926, upon an application of C. H. Hoyt, and accordingly only such portions of the machine as it is necessary to refer to for an understanding of the invention will be described herein in detail. Machines of this type are designed especially for the shaping of shoe upper materials *a* (herein referred to inclusively as the upper) about the heel end of a last *b*, and include means for wiping the margin of the upper inwardly over a sole or insole *c* on the last and means for driving a plurality of fastenings such as tacks to fasten the margin of the upper in overwiped position. The invention is illustrated by reference to the lasting of a shoe of the McKay-sewed type, but it is to be understood that the machine may be used in the manufacture of shoes of various kinds, and the term "sole" is therefore frequently used hereinafter in a generic sense to designate that part to which the upper is fastened in lasting, whether it be the insole of certain types of shoes or that part which, in shoes of other types, may be the outsole or the only sole with which the shoe is provided.

Machines of the type illustrated comprise a shoe support or jack, hereinafter more particularly referred to, upon which the shoe and last are supported and by swinging movement of which the shoe is positioned with its heel end portion within a heel-embracing band 12. This heel band is supported in the machine and is closed about the heel end of the shoe in the power operation of the machine by mechanism fully shown and described in the above-mentioned Letters Patent and which need not be described herein. In the course of the operation of the machine the shoe is engaged on the heel seat by a holddown member or presser foot 14 also automatically controlled, as disclosed in the above-mentioned Letters Patent, and co-operating with the jack to determine the heightwise position of the shoe relatively to the wiping and fastening mechanism hereinafter described.

For wiping the margin of the upper inwardly over the sole about the heel end of the last, the machine is provided with a pair of wipers 16 and 18 mounted for swinging movements toward and from each other about an axis located, as indicated at *x* (Fig. 7), at the meeting point of the wiping edges of the two wipers. To assist in maintaining the two wipers in proper relation to each other and in guiding them in their swinging movements, in accordance with one of the objects of this invention, the wiper 16 is provided with an arm or extension 20 which is curved in an arc concentric with the above-mentioned axis, and the wiper 18 is provided with a similarly curved arm or extension 22 in sliding engagement with the extension 20. By reference to Figs. 8 and 9 it will be seen that the two arms or extensions 20 and 22 are thus provided with bearing surfaces concentric with the axis of swinging movement of the wipers and in engagement with each other as indicated at 24, and also with bearing surfaces which are parallel to the plane of the wipers and are in engagement with each other as indicated at 26. The wipers are mounted on a wiper holder comprising a slide 28 and a pair of clamp members 30 and 32 which are secured together and to the slide 28 by means of a screw 34. The member 30 is provided with a tongue 36 which is seated within a groove 38 in the extension 22 of the wiper 18 when the parts are in assembled relation, this tongue and groove also being curved about the axis of swinging movement of the wipers, and there is a similar tongue-and-groove connection 40, 42 between the member 32 and the extension 20 of the wiper 16. There is also a tongue-and-groove connection 44, 46 between the two members

and 32 to assist in positioning these members in proper relation to each other. It will thus be seen that the wipers are securely held in assembled relation by means whereby they are firmly supported and are guided for swinging movements about their common axis.

The wiper-supporting slide 28 is mounted in a guideway in the head of the machine for rectilinear movements lengthwise of the shoe to advance and retract the wipers, and is provided at its rear end with a cylindrical extension 48 (Figs. 1 and 4) which is mounted in a socket in the head to assist in guiding it. Overlapping a portion of the slide is a cover plate 50 secured to the head of the machine, this cover plate having a slot 52 in which an upstanding portion of the screw 34 is guided in the movements of the slide 28. The slide 28 is operated by means of a path cam 54 formed in a cam wheel 56 which is mounted on a cam shaft 58 and is operated by means fully described in the above-mentioned Letters Patent, the connection between the cam 54 and the slide comprising a roll 60 mounted on a block 62 which is detachably secured to the slide.

For imparting to the wipers 16 and 18 swinging movements in automatically determined time relation to their movements lengthwise of the shoe, in general similarity to the organization disclosed in the prior Letters Patent, there are mounted in guideways at the opposite sides of the head of the machine slides 64 (Figs. 2 and 4), one for each of the wipers, and each slide 64 has secured thereto by means of a screw 66 a member 68 in which there is formed a slot 70 to receive a roll 72 carried by the adjacent wiper. The cover plate 50 overlaps the slides 64 and is provided with slots 74 in which upstanding portions of the screws 66 are movable. For imparting operative movements to the slides 64 the wiper-supporting slide 28 carries a member 76 provided on each of its opposite sides with a series of rack teeth 78 in engagement with a curved rack 80 formed on one end of a lever 82 which is pivotally mounted at 84 on the head of the machine. On the opposite end of the lever 82 is a curved rack 86 which engages and operates a pinion 88 in engagement with teeth formed on a rack member 90 secured adjustably by a screw 91 in a recess in the slide 64. It will thus be seen that as the wiper-supporting slide 28 moves forward to advance the wipers lengthwise of the shoe, the slides 64 through the connections described are moved inwardly toward the shoe to impart closing movements to the wipers, and that as the slide 28 is retracted, the slides 64 are likewise retracted to open the wipers. It will be understood that by the elongated slots 70 and the rolls 72 operative connections are maintained between the slides 64 and the wipers in all positions of the wipers lengthwise of the shoe.

The connections between the member 76 and the slide 28 are such that by adjusting this member relatively to the slide the wipers may be adjusted about the axis of their swinging movements to position them in proper relation to each other for operating on shoes of different sizes. For this purpose the member 76 is mounted in a recess in the slide 28 with provision for limited movements lengthwise of the slide and is provided with a pair of downwardly extending lugs 92 (Figs. 4) which fit within recesses formed in a block 94 also movable lengthwise of the slide 28 and provided with a bore having screw threads engaged by the threads of a shaft 96. The shaft 96 is rotatably mounted at its opposite ends in bearing blocks 98 which are inserted in recesses in the slide 28, and fast on the shaft is a bevel-gear 100 engaged by another bevel-gear 102 provided with a cylindrical stud 104 mounted in a bearing in one side of the slide 28. It will thus be seen that by turning the gear 102 the interiorly threaded block 94 may be moved in one direction or the other lengthwise of the slide 28, carrying with it the member 76 upon which the rack teeth 78 are formed, and that through the connections between these rack teeth and the slides 64 the wipers are adjusted about the axis of their swinging movements. For turning the gear 102 there is mounted in the head of the machine a shaft 106 having on its inner end a tongue 108 arranged to enter a recess 110 formed in the stud 104 when the shaft 106 is moved inwardly from the position illustrated in Fig. 4. The shaft 106 may thus be moved inwardly against the resistance of a spring 109 which acts normally to hold it disconnected from the stud 104 and thus to avoid interference with the operative movement of the slide 28. When the parts of the machine are in starting positions, as illustrated in Fig. 4, the shaft 106 is in alinement with the stud 104 and the tongue 108 may be connected to the stud by pushing the shaft inwardly. Then, by use of a hand wheel 110 on the shaft the required adjustment of the wipers may be effected.

For securing the margin of the upper in overwiped position in the manner contemplated by the present invention the illustrated machine is provided with means carried by the wipers 16, 18 for driving upper-fastening tacks through openings 112 (Fig. 7) extending through the wipers in locations near their wiping edges. Each of the wipers is provided at its inner edge with an upstanding flange 114 in which there are formed in perpendicular relation to the plane of the wipers a series of grooves 116 in alinement with the openings 112. Secured in fixed relation to each of the wipers by means of bolts, one of which is shown at 118 in Fig. 5, is a

tacker block 120 provided with a plurality of driver passages 122 in line with the grooves 116. Mounted in recesses in each block 120 are tack fingers 124 which are pressed by springs 126 toward the flange 114 and are so shaped as to co-operate with the grooves 116 of the flange to provide pockets for receiving and positioning upper-fastening tacks *t*. The tacks are fed to the tack pockets through flexible tubes 128 which are connected to the blocks 120 and lead from tack-supplying mechanism 130 of the same character as provided heretofore in machines of the type illustrated.

Mounted in the driver passages 122 of each of the blocks 120 are a plurality of tack drivers 132 which are secured at their upper ends to a curved driver block 134 movable in a similarly curved recess provided in the block 120. It will be seen that the driver blocks 134 and the drivers 132 are thus movable in a direction substantially perpendicular to the plane of the wipers. On the upper end of each of the blocks 134 is mounted a stud 136 which is located in a slot formed in an inverted T-shaped operating member 138 and is provided with a head which overlaps this member. The member 138 is pivoted at 140 (Fig. 1) on a link 142, and the upper end of this link is pivoted at 144 on a driver-operating head 146 guided for vertical movements on a fixed rod 148. The head 146 is connected by a link 150 to a lever 152 pivotally supported at its rear end on a link 154. The lever 152 is operated and controlled by means constructed substantially as shown and described in the Letters Patent hereinbefore mentioned, comprising a cam 156 on the shaft 58 which acts through a plunger 158 to lift the lever and with it the driver-operating head 146, and springs 160 (only one of which is shown) which act through rods 162 to impart downward driver-operating movement to the lever when permitted by the cam 156. It will be evident that when the lever 152 is moved upwardly by its cam, the member 138 acts through the studs 136 to lift the driver blocks 134 and thereby to retract the drivers 132, and that by reason of the slots in the member 138 and the pivotal connection of the link 142 with this member and with the head 146, the operative connections between the driver blocks 134 and their operating means are maintained at all times without interfering with the movements of the wipers.

It will be seen that the tacker blocks 120 are not only secured to the wipers by the bolts 118, but are also overlapped by a portion of the wiper-supporting and guiding member 30 (Fig. 1) on the slide 28, and by portions of the slides 64 (Figs. 2 and 4) through which the closing and opening movements of the wipers are effected. Between the overlapping portion of each slide 64 and the block 120 there is mounted a plate 164 which is between the slide and the member 68 and is secured in place by the screw 66.

It will be evident that the arrangement above described, whereby a gang of drivers 132 is carried by each of the wipers and is movable as a unit in a direction perpendicular to the plane of the wipers, is structurally simple and compact, and that it also permits the drivers to be readily operated by the comparatively simple means illustrated. It is desirable, however, that the tacks be driven in directions inclined inwardly away from the edge of the shoe bottom, in order that as they are driven they will have no loosening effect on the upper but will rather tend to draw it more tightly over the last. This is especially desirable in heel-seat lasting by reason of the fact that the heel seat of a shoe is usually more or less convex. The means hereinbefore described for positioning the tacks *t* over the openings 112 in the wipers is accordingly so constructed that the tacks as they are supported under the drivers are inclined in directions leading inwardly away from the edge of the shoe bottom, as illustrated in Fig. 2. For the purpose in view the tack fingers 124, which co-operate with the wiper flanges 114 to provide pockets for the tacks, have sloping faces centrally grooved, as indicated at 165 (Fig. 3), whereby the points of the tacks are deflected or guided into the vertical grooves 116 of the wiper flanges when the tacks are fed to the tack pockets. The fingers 124, moreover, are so formed that they do not enter the grooves 116, and accordingly these grooves provide restricted openings leading from the tack pockets which receive the lower ends of the shanks of the tacks. The tacks thus become wedged in these grooves with their points projecting downwardly below the fingers 124, as illustrated in Fig. 2, and with both their points and their heads against the vertical walls of the grooves, so that they are inclined in the manner desired. Furthermore, in the driving operation the spring-controlled fingers 124, which are yieldable in response to the movement of the drivers 132, serve by engagement with the tacks to maintain their points and heads against the walls of the grooves 116 until the tacks begin to enter the shoe. It will be understood that after the points of the tacks have entered the shoe at the inclinations referred to, their shanks will follow the same general course as they are forced farther into the shoe. The tacks are thus driven into the shoe materials in directions inclined inwardly away from the edge of the shoe bottom and in various angular relations to one another, each tack being inclined in a plane substantially perpendicular to that portion of the edge of the shoe bottom which is nearest thereto. To assist in driving the tacks in this manner the lower end faces of the drivers 132 are so inclined

that they are substantially parallel to the heads of the inclined tacks, as illustrated in Figs. 2 and 3. It will be understood that in response to engagement of the lower ends of the drivers with the tack fingers 124 in the tack-driving operation, the fingers are retracted far enough to permit the heads of the tacks to pass.

The means for supporting the last and shoe for the operations hereinbefore described comprises a jack mounted for swinging movements in directions lengthwise of the shoe to carry the shoe into and out of lasting position in the same general manner as illustrated in Letters Patent No. 1,558,737, granted on October 27, 1925 upon an application of R. F. McFeely, the jack including a member or post 166 (Fig. 11) which carries a heel pin or spindle 168 adapted to project into the usual spindle hole provided in the heel end of the last. It is desirable that in the heel-seat lasting operation the wipers shall wipe the margin of the upper inwardly with substantially the same pressure at the opposite sides of the heel seat. In different lasts, however, the spindle holes are not always bored in uniform angular relation to the bottom faces of the lasts. The machine herein shown is accordingly provided with work-supporting means whereby the desired pressure relation between the wipers and the opposite sides of the heel seat will be secured notwithstanding such variations in the construction of different lasts. For the purpose in view the upper end of the post 166 is provided with a slot extending laterally of the shoe, and the portions of the post at the opposite sides of the slot have upper faces, one of which is shown at 170, providing a guideway curved about an axis indicated by the point *y* (Fig. 11). Mounted in this slot is the lower portion of a block 172 which carries the spindle 168, this block having shoulders curved similarly to the faces 170 and seated thereon. The block 172 and the spindle 168 are thus permitted to move laterally of the shoe about an axis located, as illustrated, substantially at the heel-seat face of the shoe and substantially midway between the opposite sides of the shoe, so that the shoe may be adjusted to position the opposite sides of the heel seat in substantially the same relation to the plane of the wipers without any substantial lateral bodily displacement of the shoe relatively to the heel band and the wipers. The block 172 and the spindle 168 are normally centralized by means of a spring 174 which is mounted in a recess in the lower end of the block and is held under compression between disks 176 slidingly movable in the recess in which the spring is mounted, the spring and the disks being held in assembled relation in the block by a lug 178 which is secured to the block in engagement with one of the disks. The block 172 is provided with a transverse slot extending across it below the spring 174, and extending into this slot in engagement with the disks 176 are lugs 180 which are secured to the post 166. It will thus be evident that while the block 172 and its spindle are normally centralized by the spring 174, they may move in either direction along the curved guideway 170 against the resistance of the spring. The operator may effect such movement by tipping the last in one direction or the other as he presents the shoe to the machine, or the movement may result from excess of pressure of the wipers at one side or the other of the heel seat, the arrangement thus being such that if the shoe is not presented initially in position to receive substantially the same wiper pressure at the opposite sides of the heel seat, the pressure will be substantially equalized automatically in the operation of the machine. In order to limit the extent of movement of the block 172 there is further provided a screw 182, shown in section, which is mounted in the post 166 and projects into a slot 184 in the block 172.

While the axis *y* is herein illustrated as located exactly on the heel-seat face of the insole *c*, as it would preferably be, for example, in operating on a shoe of average size, it will be understood that the position of the axis in relation to the shoe bottom will vary slightly in the operation of the machine on shoes of different sizes. Such variation is not enough to result in any material lateral displacement of a shoe of any size within the small range of adjustment necessary for securing equalization of pressure on the heel seat. Novel features of the illustrated shoe-supporting means are claimed in a divisional application, Serial No. 549,400 filed on July 8, 1931.

In the operation of the machine, briefly summarized, the shoe is positioned in the manner hereinbefore described and is clamped about its heel end in the power operation of the machine by the action of the heel band 12. The wipers 16 and 18 are then advanced and closed by the cam 54 and the operating connections hereinbefore described to wipe the margin of the heel end portion of the upper inwardly over the sole, the cam in the construction herein shown being so shaped that there are thus imparted to the wipers two full overwiping movements in succession. At the end of the second overwiping movement and while the wipers are maintained at the inner limit of that movement, the tacks are driven through the openings 112 in the wipers to secure the margin of the upper in overwiped position. It will be understood that prior to the driving operation the tacks are supplied to the tack pockets and are held therein in positions inclined inwardly away from the edge of the shoe bottom, as hereinbefore more particularly described. When the cam 156 releases the lever 152 to the action of the springs 160,

the two driver blocks 134 are moved downwardly to cause the drivers to drive the tacks from the tack pockets and into the shoe. As the tacks are forced downwardly by the drivers, the tack fingers 124 hold them with their points and heads against the vertical walls of the grooves 116 until they begin to enter the shoe, after which they follow substantially the inclined courses thus determined until they are driven fully in and are clinched on the metal plate *d* on the last, as illustrated in Fig. 3. It will be evident that with the tacks thus driven in predetermined inwardly inclined directions, insurance is afforded that they will be clinched inwardly in directions away from the edge of the shoe bottom. After the tacks have thus been driven the drivers are lifted and the wipers are retracted from over the shoe, the various parts of the machine being returned to their starting positions.

Experience has demonstrated that it is entirely practicable, at all events for heel-seat lasting, to use the same wipers in operating on shoes of widely different sizes including, in fact, the entire range of sizes of adults' shoes, the wipers and the tacking means thereon being adjusted for different sizes by the described mechanism controlled by the hand wheel 110. It will accordingly be evident that the upper-fastening tacks driven through each wiper are spaced at equal distances from one another in the different sizes of shoes, which is a very desirable condition from the shoe-making standpoint. For widely differing sizes the numbers of the tacks may be varied by the use of means with which machines of the type illustrated are customarily provided for either permitting or preventing delivery of tacks to one or more of the tack pockets at each side located nearest to the front end of the heel seat.

In Fig. 6 there is shown at the rear end of the heel seat a tack *e* which is an assembling tack driven and clinched as usual in the assembling of the shoe materials prior to the heel-seat lasting operation, this tack occupying a position between the rearmost tacks driven by the mechanisms carried by the wipers.

In the appended claims the expression "edge of the shoe bottom" used in defining the relation of the fastenings to the shoe is to be understood as meaning, with reference to each fastening, that portion of the edge which is nearest to the location of the fastening.

Having described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive fastenings for securing the margin of the upper in overwiped position, and means for controlling the fastenings in such manner as to cause them to be driven into the shoe in directions inclined inwardly away from the edge of the shoe bottom by the movement of the drivers.

2. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive fastenings for securing the margin of the upper in overwiped position, and means for maintaining the fastenings until they begin to enter the shoe in such inclined relation to the paths of movement of the drivers as to direct them inwardly away from the edge of the shoe bottom as they are driven.

3. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, and means for positioning each tack prior to its entry into the shoe with its point and one side of its head substantially tangential to a line parallel to the direction of movement of its driver and in such relation to the shoe as to direct the tack on an incline inwardly away from the edge of the shoe bottom as it is driven.

4. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, and means for positioning each tack prior to its entry into the shoe with its point and one side of its head substantially tangential to a line parallel to the direction of movement of its driver and in such relation to the shoe as to direct the tack on an incline inwardly away from the edge of the shoe bottom as it is driven, each driver having its tack-engaging end face so inclined as to position it in substantially parallel relation to the head of the inclined tack.

5. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, means arranged to present for each tack a guide wall substantially parallel to the direction of the move-

ment of its driver and located at that side of the tack which is farthest from the edge of the shoe bottom, and means for yieldingly pressing the point and the head of each tack against said guide wall to direct the tack inwardly away from the edge of the shoe bottom as it is driven.

6. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, means arranged to present for each tack a guide wall substantially parallel to the direction of the movement of its driver and located at that side of the tack which is farthest from the edge of the shoe bottom, and a plurality of spring-controlled tack fingers arranged to press the points and the heads of the tacks against their guide walls in the tack-driving operation to direct the tacks inwardly away from the edge of the shoe bottom as they are driven, the drivers being so formed as to present tack-engaging end faces substantially parallel to the heads of the inclined tacks.

7. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, means arranged to present for each tack a guide wall substantially parallel to the direction of the movement of its driver and located at that side of the tack which is farthest from the edge of the shoe bottom, and yieldable tack fingers arranged to co-operate with said guide walls to provide pockets for the tacks, said fingers and guide walls being so formed and arranged as to provide restricted openings leading from the tack pockets adjacent to the guide walls to receive the lower ends of the tacks and position the tacks initially with their points and heads against said guide walls in inclined relation to the drivers.

8. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, and means for positioning the tacks in such inclined relation to the paths of movement of the drivers as to direct them inwardly away from the edge of the shoe bottom as they are driven, the drivers being so formed as to present tack-engaging end faces substantially parallel to the heads of the inclined tacks.

9. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, and means for driving a plurality of tacks into the shoe in directions inclined inwardly away from the edge of the shoe bottom for securing the margin of the upper in overwiped position, said means comprising a plurality of drivers operatively movable in directions substantially perpendicular to the plane of the wipers and provided with tack-engaging end faces inclined to said plane for driving the tacks at the desired inclinations.

10. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive fastenings for securing the margin of the upper in overwiped position, and means carried by the wipers for positioning the fastenings in such inclined relation to the paths of movement of the drivers as to cause them to be driven into the shoe in directions inclined inwardly away from the edge of the shoe bottom by the movement of the drivers.

11. A machine of the class described having, in combination, means for working the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers all movable in substantially parallel relation to one another for driving fastenings at both sides of the end of the shoe bottom to secure the margin of the upper to the sole, and means for controlling the fastenings in such manner as to cause each fastening to enter the shoe in a direction inclined inwardly away from the edge of the shoe bottom in a plane substantially perpendicular to said edge in response to the movement of its driver.

12. A machine of the class described having, in combination, means for working the margin of an upper inwardly over a sole about an end of a shoe, a plurality of drivers all movable in substantially parallel relation to one another for driving tacks at both sides of the end of the shoe bottom to secure the margin of the upper to the sole, and yieldable means for positioning said tacks in such inclined relation to the paths of movement of the drivers as to cause each tack to be driven into the shoe in a direction inclined inwardly away from the edge of the shoe bottom in a plane substantially perpendicular to said edge.

13. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe and provided with a plurality of openings extending through

them, a plurality of drivers movable in directions substantially perpendicular to the plane of the wipers to drive fastenings through said openings for securing the margin of the upper in overwiped position, and means for positioning the fastenings in such inclined relation to the paths of movement of the drivers as to cause them to be driven into the shoe in directions inclined inwardly away from the edge of the shoe bottom by the movement of the drivers.

14. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe and provided with a plurality of openings extending through them, a plurality of drivers mounted to move inwardly with said wipers in fixed relation thereto and movable in directions substantially perpendicular to the plane of the wipers to drive fastenings through said openings for securing the margin of the upper in overwiped position, and means for controlling the fastenings in such manner as to cause them to enter the shoe in directions inclined inwardly away from the edge of the shoe bottom in response to the movement of the drivers.

15. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe and provided with a plurality of openings extending through them, a plurality of drivers mounted to move inwardly with said wipers in fixed relation thereto and movable in directions substantially perpendicular to the plane of the wipers to drive fastenings through said openings for securing the margin of the upper in overwiped position, and means for maintaining the fastenings until they begin to enter the shoe in such inclined relation to the paths of movement of the drivers as to direct them inwardly away from the edge of the shoe bottom as they are driven.

16. A machine of the class described having, in combination, wipers movable to wipe the margin of an upper inwardly over a sole about an end of a shoe and provided with a plurality of openings extending through them, a plurality of drivers mounted to move inwardly with said wipers in fixed relation thereto and movable in directions substantially perpendicular to the plane of the wipers to drive tacks through said openings for securing the margin of the upper in overwiped position, and means for positioning the tacks in such inclined relation to the paths of movement of the drivers as to direct them inwardly away from the edge of the shoe bottom as they are driven, the drivers being so formed as to present tack-engaging end faces substantially parallel to the heads of the inclined tacks.

17. A heel-end-lasting machine having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper about the heel end of a last inwardly over the bottom of the last, a gang of drivers carried by each of said wipers and movable in a direction substantially perpendicular to the plane of the wipers to drive fastenings for securing the margin of the upper in overwiped position, and means for controlling said fastenings in such manner as to cause them to enter the shoe in directions inclined inwardly away from the edge of the shoe bottom in response to the movement of the drivers.

18. A heel-end-lasting machine having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper about the heel end of a last inwardly over the bottom of the last, a gang of drivers carried by each of said wipers and movable in a direction substantially perpendicular to the plane of the wipers to drive tacks for securing the margin of the upper in overwiped position, and means for positioning said tacks in such inclined relation to the paths of movement of the drivers as to direct them inwardly away from the edge of the shoe bottom as they are driven, the drivers being so formed as to present tack-engaging end faces substantially parallel to the heads of the inclined tacks.

19. A heel-end-lasting machine having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper about the heel end of a last inwardly over the bottom of the last, said wipers having a plurality of openings extending through them, a gang of drivers mounted for movement inwardly with each of said wipers in fixed relation to one another and movable in a direction substantially perpendicular to the plane of the wipers to drive tacks through said openings for securing the margin of the upper in overwiped position, and means for positioning said tacks in such inclined relation to the paths of movement of the drivers as to cause them to enter the shoe in directions inclined inwardly away from the edge of the shoe bottom.

20. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having an upstanding flange thereon and having a plurality of openings extending through it adjacent to said flange, means movable with each wiper constructed to co-operate with said flange to provide pockets for a plurality of fastenings, and means for driving the fastenings through the openings in the wipers to secure the margin of the upper in overwiped position.

21. A machine of the class described having, in combination, a pair of wipers mount-

ed for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having an upstanding flange thereon and having a plurality of openings extending through it adjacent to said flange, a device secured in fixed relation to each wiper and having a plurality of yieldable members constructed and arranged to co-operate with said flange to provide pockets for a plurality of fastenings, and means for driving the fastenings through the openings in the wipers to secure the margin of the upper in overwiped position.

22. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having an upstanding flange thereon and having a plurality of openings extending through it adjacent to said flange, a device secured in fixed relation to each wiper and having a plurality of yieldable members constructed and arranged to co-operate with said flange to provide pockets for a plurality of fastenings, and a plurality of drivers carried by the wipers for driving the fastenings through said openings to secure the margin of the upper in overwiped position.

23. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having a plurality of openings extending through it and having thereon an upstanding flange provided with grooves in alinement with said openings, means movable with each wiper constructed to co-operate with said grooves to provide pockets for a plurality of fastenings, and means for driving the fastenings through the openings in the wipers to secure the margin of the upper in overwiped position.

24. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having thereon an upstanding flange and having a plurality of openings extending through it adjacent to said flange, means movable with each wiper for positioning a plurality of tacks with their points and heads against said flange to incline them relatively to the plane of the wipers in directions leading inwardly away from the edge of the shoe bottom, and means for driving the tacks thus positioned through the openings in the wipers to secure the margin of the upper in overwiped position.

25. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having thereon an upstanding flange and having a plurality of openings extending through it adjacent to said flange, means movable with each wiper for positioning a plurality of tacks with their points and heads against said flange to incline them relatively to the plane of the wipers in directions leading inwardly away from the edge of the shoe bottom, and drivers movable in directions substantially perpendicular to the plane of the wipers to drive the tacks thus positioned through the openings in the wipers for securing the margin of the upper in overwiped position.

26. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having thereon an upstanding flange and having a plurality of openings extending through it adjacent to said flange, means movable with each wiper for positioning a plurality of tacks with their points and heads against said flange to incline them relatively to the plane of the wipers in directions leading inwardly away from the edge of the shoe bottom, and a gang of drivers carried by each wiper and movable in a direction substantially perpendicular to the plane of the wiper to drive the tacks thus positioned through the openings in the wiper for securing the margin of the upper in overwiped position.

27. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having a plurality of openings extending through it and having thereon an upstanding flange provided with grooves in substantially perpendicular relation to the plane of the wiper and in alinement with said openings, yieldable means carried by each wiper constructed to co-operate with said grooves to provide pockets for a plurality of tacks and to position the tacks with their points and heads against the walls of the grooves to incline them relatively to the plane of the wipers in directions leading inwardly away from the edge of the shoe bottom, and drivers movable in directions substantially perpendicular to the plane of the wipers to drive the tacks through the openings in the wipers for securing the margin of the upper in overwiped position.

28. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having a plurality of openings extending through it and having thereon an upstanding flange provided with grooves in substantially perpendicular relation to the plane of the wiper and

in alinement with said openings, a member secured in fixed relation to each of said wipers and provided with driver passages in alinement with said grooves, drivers in said passages, and means co-operating with the grooves of said flange to position the fastenings in such inclined relation to the paths of movement of the drivers as to cause them to enter the shoe in directions inclined inwardly away from the edge of the shoe botttom in response to the movement of the drivers for securing the margin of the upper in overwiped position.

29. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having a plurality of openings extending through it and having thereon an upstanding flange provided with grooves in substantially perpendicular relation to the plane of the wiper and in alinement with said openings, yieldable tack fingers arranged to co-operate with said grooves to provide pockets for a plurality of tacks and so formed as to permit the lower ends of the tacks to follow said grooves below the fingers when the tacks are fed to the tack pockets to position them with their points and heads against the walls of said grooves in inclined relation to the plane of the wipers, and drivers movable in substantially perpendicular relation to the plane of the wipers to drive the tacks through the openings in the wipers for securing the margin of the upper in overwiped position.

30. A machine of the class described having, in combination, a pair of wipers mounted for swinging movements to wipe the margin of an upper inwardly over a sole about an end of a shoe, each of said wipers having a plurality of openings extending through it and having secured in fixed relation thereto a member provided with a plurality of driver passages in alinement with said openings and extending in substantially perpendicular relation to the plane of the wipers, drivers mounted in said driver passages, and means for positioning fastenings in such inclined relation to the paths of movement of the drivers as to cause them to enter the shoe in directions inclined inwardly away from the edge of the shoe bottom in response to the movement of the drivers for securing the margin of the upper in overwiped position.

31. A machine of the class described having, in combination, means movable inwardly over the bottom of a shoe to lay the margin of the upper over the sole, a driver movable in a direction substantially perpendicular to the direction of inward movement of said overlaying means to drive a fastening for securing the margin of the upper to the sole, and means for controlling the fastening in such manner as to cause it to be driven into the shoe in a direction inclined inwardly away from the edge of the shoe bottom by the movement of the driver.

32. A machine of the class described having, in combination, a wiper movable inwardly over the bottom of a shoe to lay the margin of the upper over the sole, said wiper having an opening extending through it, a driver movable inwardly with said wiper and movable in a direction substantially perpendicular to the plane of the wiper to drive a fastening through said opening for securing the margin of the upper in overwiped position, and means for controlling the fastening in such manner as to cause it to be driven into the shoe in a direction inclined inwardly away from the edge of the shoe bottom by the movement of the driver.

33. A machine of the class described having, in combination, means movable inwardly over the bottom of a shoe to lay the margin of the upper over the sole, a driver movable in a direction substantially perpendicular to the direction of inward movement of said overlaying means to drive a tack for securing the margin of the upper to the sole, and means for positioning the tack in such inclined relation to the direction of movement of the driver as to direct it inwardly away from the edge of the shoe bottom as it is driven, the driver having its tack-engaging end face so inclined as to position it in substantially parallel relation to the head of the inclined tack.

34. In a machine of the class described, a pair of wipers mounted for swinging movements to wipe the margin of an end portion of an upper inwardly over a form, said wipers having curved arms extending therefrom and arranged for engagement with each other to assist in guiding them in their swinging movements.

35. In a machine of the class described, a pair of wipers mounted for swinging movements to wipe the margin of an end portion of an upper inwardly over a form, said wipers having curved arms extending therefrom and arranged for engagement with each other to assist in guiding them in their swinging movements, and a wiper holder having curved bearing surfaces arranged for engagement with said arms to assist in guiding the wipers.

36. In a machine of the class described, a pair of wipers mounted for swinging movements about an axis located substantially at the wiping edge thereof to wipe the margin of an end portion of an upper inwardly over a form, said wipers having extensions provided with bearing surfaces curved in arcs concentric with said axis and arranged for engagement with each other to assist in guiding the wipers in their swinging movements.

37. In a machine of the class described, a pair of wipers mounted for swinging movements about an axis located substantially at

the wiping edge thereof to wipe the margin of an end portion of an upper inwardly over a form, said wipers having extensions provided with bearing surfaces curved in arcs concentric with said axis and arranged for engagement with each other to assist in guiding the wipers in their swinging movements, and a wiper holder having bearing surfaces also curved about said axis and arranged for engagement with said extensions to assist in guiding the wipers.

38. In a machine of the class described, a pair of wipers mounted for swinging movements to wipe the margin of an end portion of an upper inwardly over a form, said wipers having arms extending therefrom and provided with curved bearing surfaces arranged for engagement with each other to assist in guiding the wipers in their swinging movements, and a wiper holder having curved tongue-and-groove connections with said arms to assist in guiding the wipers.

In testimony whereof I have signed my name to this specification.

JACOB C. JORGENSEN.

wiping edge thereof to wipe the margin of an end portion of an upper inwardly over a form, said wipers having extensions provided with bearing surfaces curved in arcs concentric with said axis and arranged for engagement with each other to assist in guiding the wipers in their swinging movements, and a wiper holder having bearing surfaces also curved about said axis and arranged for engagement with said extensions to assist in guiding the wipers.

3. In a machine of the class described, a pair of wipers mounted for swinging movements to wipe the margin of an end portion of an upper inwardly over a form, said wipers having arms extending therefrom and provided with curved bearing surfaces arranged for engagement with each other to assist in guiding the wipers in their swinging movements, and a wiper holder having curved lodge and groove connections with said arms to assist in guiding the wipers.

In testimony whereof I have signed my name to this specification.

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(Model.) 2 Sheets—Sheet 1.

G. W. COPELAND, M. BROCK & J. E. CRISP.

LASTING MACHINE.

No. 244,714. Patented July 19, 1881.

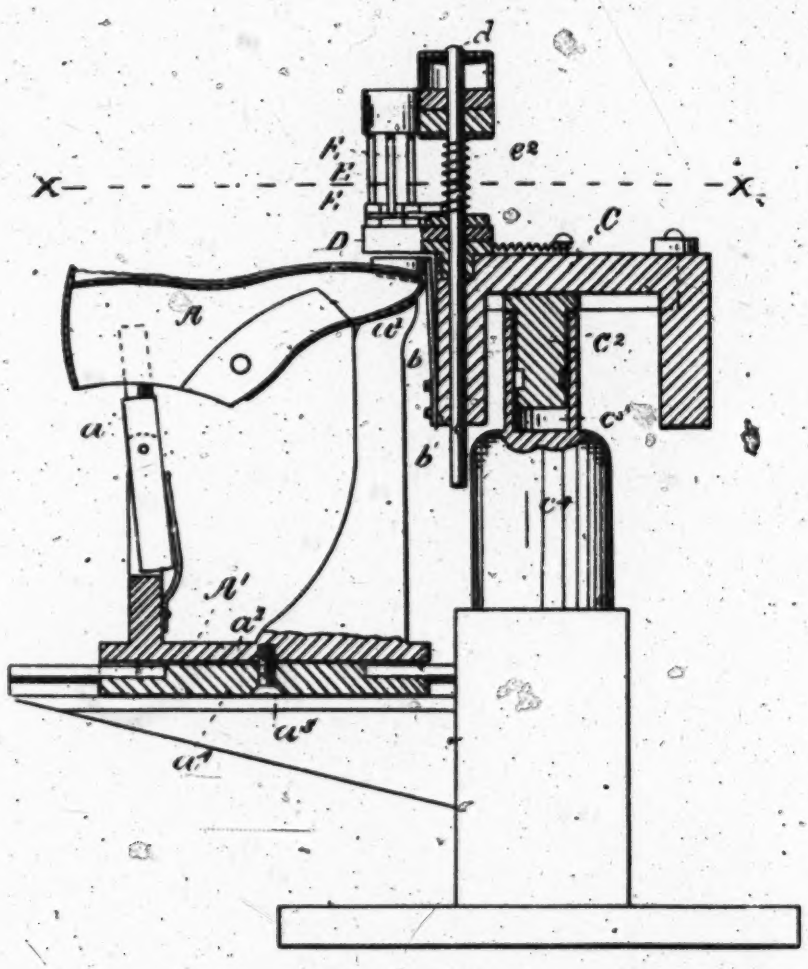


Fig. 1.

WITNESSES

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(Model.) 2 Sheets—Sheet 2.

G. W. COPELAND, M. BROCK & J. E. CRISP.

LASTING MACHINE.

No. 244,714. Patented July 19, 1881.

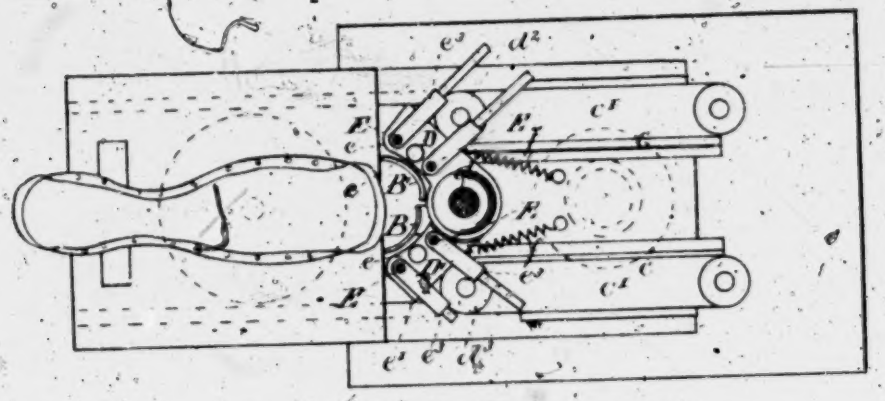


Fig. 2.

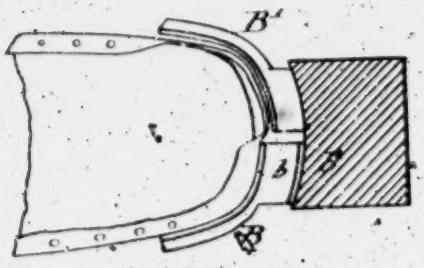


Fig. 3.

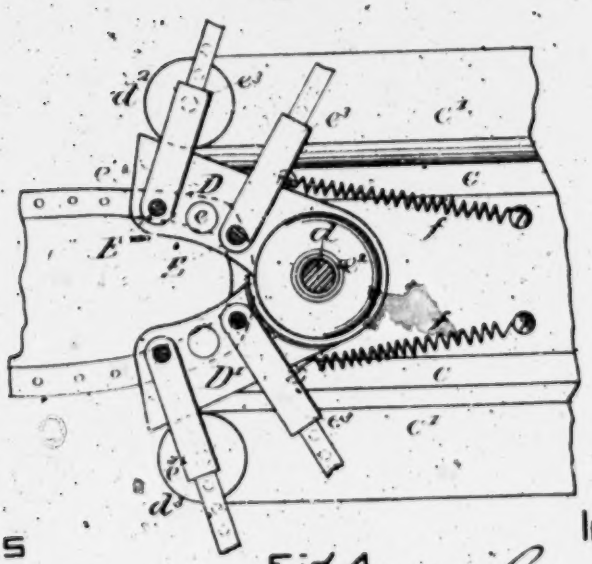


Fig. 4.

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LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 244,714, dated July 19, 1881.

Application filed June 21, 1881. (Model.)

o all whom it may concern:

Be it known that we, GEORGE W. COPELAND, Malden, MATTHIAS BROCK, of Boston, and SEPH E. CRISP, of Boston, all in the State Massachusetts, citizens of the United States, ve invented a certain new and useful Im-rovement in Boot and Shoe Lasting Ma-ines, of which the following is a full, clear, d exact description, reference being had to e accompanying drawings, forming a part of is specification, in explaining its nature, in hich—

Figure 1 is a vertical section of the machine. ig. 2 is a plan thereof. Fig. 3 is a detail view, larged, representing a portion of the ma-ine hereinafter referred to. Fig. 4 is a plan, larged, of a portion of the mechanism be-w the line *x x* of Fig. 1.

This invention relates more especially to de-ices for lasting the toe and heel portions of oots and shoes, and it embraces, first, means r holding the upper to the side of the last, out the toe or heel, prior to the folding of e edge thereof upon the surface of the in-le; second, folding-plates, or devices for fold-g the edge of the upper upon the insole, and gang or group of devices for driving fasten-gs simultaneously or by a single impulse ter the folding-plates have performed their nctions, and which may or may not be placed position to be operated by them; third, the nstruction and arrangement of parts here-after more fully described.

In the drawings, A is the last. It is mounted the heel upon the pin *a* of the jack A', and the toe upon the toe-support *a'* of the jack. e pin and toe support of the jack project wardly from the bed a^2, which is pivoted, so to be revolved, at a^3 to the sliding plate a^4. is sliding plate has a horizontal movement, suitable guides, to and from the lasting de-ces.

The appliance or device for holding the edge the upper against the side and end surface the last consists in two curved arms, B B', h of which is aped and conformed to that tion of the side and end of the last upon ch it is to operate. They may be made of l, sufficiently thin to conform by yielding to the surface of the last; or they may be made of metal, and be lined upon their surfaces with rubber or leather or other material; or they may be made in any other suitable way. They are each mounted on a yielding or spring arm, *b*, and one is arranged to project slightly in advance of the other, so that upon the presentation of the last and upper thereto they shall be brought in contact with the holding device upon one side and corner, and the upper drawn up by pinchers, or in any other suitable way, upon that side and corner immediately before being brought in contact, and while being brought in contact, with said advance holding device; and that portion of the upper having been drawn up and fitted and being held by the holding device, the last and upper are then moved to the other upper-holding device, adapted to act upon the other corner and side of the last, and the upper is pulled up by pinchers, or any other way, immediately before and while being brought in contact therewith, and is held up thereby afterward until the action of the folding-plates; or, in other words, the two upper holding or clamping devices are so arranged in relation to each other and to the jack that that portion of the upper about one corner of the last is first fitted to the end and side surface of the last, and held up by the holding-plate; and that then the portion about the other corner is brought in contact with the second or other upper-holding device and fitted to the last, as explained, whereby the toe or heel of the upper is fitted to the toe or heel end of the last in successive sections. Of course these upper-holding devices may be secured to a moving block or head, as herein described; or they may be stationary, and the last moved in relation thereto; or the last may be stationary and they may be moved in relation to it without departing from the spirit of this portion of our invention.

The next feature of our invention has to do with the folding of the edge of the upper upon the insole at the toe and heel, and the fastening of the edge thus folded to the insole by a group or gang of fastenings driven by a single impulse or simultaneously.

We have represented the jack as capable of being reversed or revolved on a horizontal plane, and we have represented the spring-arms carrying the upper-holders B B′ as secured to the block or post b'. This block or post projects downwardly from the plate or bed C, which is adapted to slide horizontally in suitable ways, c, in the frame c' of the machine, and this frame c' is provided with the post c^2, which enters the socket c^3 on the standard c^4, and furnishes means whereby the frame-bed and appendages may be revolved. One end of the sliding bed or plate carries the toe-lasting plates D D′. These plates are pivoted at their inner ends to the post d, and upon the inward movement of the bed or plate are caused to be shut or closed upon the surface of the insole by means of the rolls d^2 d^2 upon the frame c'. The outer surface of the plates coming in contact with the rolls as the bed or plate slides inwardly, causes the plates to be closed. The folding-plates are provided with a series of holes or nozzles, e, which are arranged a little back from the edge of the plates, and in these holes or nozzles a corresponding series or group of drivers, E, are arranged to be reciprocated by any suitable means; and we describe as one the attachment of the drivers to the hinged blocks e', and the use of the rod d, in connection with a treadle when operated by foot-power, and a cam or lever when operated by motive power, for reciprocating said blocks. In this event the blocks would be hinged upon the rod d, and would be provided a vertical movement.

The spring e^2 may or may not be used for returning the blocks to their normal position in connection with the mechanism herein described for reciprocating them. Each driveway, nozzle, or hole e has opening into it a feed-passage, e^3, preferably horizontal, by which the fastenings are fed to the drivers.

The fastening we prefer to use is that shown and described in Letters Patent No. 197,609, granted said Copeland and Brock, and dated November 27, 1877, and No. 186,663, granted said Copeland.

The shape of feedway, the device for feeding said strip, and the manner of driving tacks therefrom are shown and described in Letters Patent No. 197,608, granted Copeland, Woodward and Brock, dated November 27, 1877; and in No. 234,854, granted said Copeland and Brock, dated November 30, 1880; and we need not, therefore, further describe the construction and operation of the fastening-driving mechanism, excepting to say that such devices, when used for driving fastenings in this invention, are arranged in gangs or groups, each device having a nozzle, feedway, feed mechanism, and driveway substantially like those described in said Letters Patent, the drivers, however, being arranged to be operated together, or by a single impulse, the feedways being converging, or substantially converging, in direction, and the nozzles preferably being formed in the folding-plates, and being placed or moved into position in relation to the edge of the last by them.

In operation the upper, being mounted upon the last and secured thereto temporarily at the toe and heel, is, with the last, placed upon the jack, and the upper, last, and jack are then moved to the upper-holding device, and the upper having been fitted to the sides and ends, and being held by the holding device, the edge to be folded being above the surface of the insole and in a vertical position, the upper, last, jack, and upper-holding device are then moved horizontally under the folding-plates, and by their continued movement cause the folding-plates to be closed upon the surface of the insole, thereby folding the edge of the upper thereon, and at the same time bringing the group or gang of driving devices in proper position for driving the group or gang of fastenings. The group or gang of fastenings is then driven simultaneously or by a single impulse.

This description of the operation of the machine answers as well for the heel lasting and securing appliances as for the toe, and the toe having been lasted, the only thing necessary to do to last the heel is to reverse the jack and reverse the frame c', and the other end of the frame, which is provided with the heel-lasting appliances, which are in every respect, excepting that of shape, a counterpart of the lasting devices already described, are brought into the position occupied by the toe-lasting devices, and the heel is then lasted, as above described.

The heel-lasting devices, being secured at the end of the sliding plate C, are by the movement of the toe-lasting plates inwardly caused to assume, automatically, the proper position which the apparatus should bear at the commencement of the lasting—that is, the upper-holding devices are thrown forward and the folding-plates are opened.

We have shown the springs f attached to the folding-plates and to the sliding plate for automatically opening the plates; but any other suitable equivalent device may be employed.

Of course we do not confine ourselves in the practice of this invention to the arrangement of the folding-plates and fastening-driving devices herein described, or to the use of fastening-driving devices adapted to drive only the "Copeland tack-strip," so called; but we may use, in combination with the folding-plates, any arrangement of devices for driving fastenings of any description desirable, and may give them any suitable location and movement in relation to the lasting-plates, the essential features being that the devices for driving fastenings shall be so constructed and located that they can be brought in position either by their movement in relation to the last or the movement of the last in relation to them, and the fastenings driven simultaneously, or by a single impulse, while the lasting-plates are

holding the turned-in edge upon the surface of the insole.

The advantages of this invention are that the toe and heel, or either, can be lasted much more rapidly than by the ordinary toe and heel lasting mechanism.

In lieu of reciprocating the drivers, as herein described, we mention the use of a hammer, by which the blocks supporting the drivers may be driven downwardly against the stress of the spring e^3.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a machine for lasting the uppers of boots and shoes, the upper-holding devices B B′, one of which is arranged in advance of the other and adapted to operate or be operated upon before the other, all substantially as and for the purposes described.

2. In a machine for lasting the uppers of boots and shoes, the combination of a jack for holding the last having a horizontal movement, upper-holding devices adapted to be brought in contact with the edge of the last at the toe or heel in successive order, and folding-plates for simultaneously folding the edge of the upper held up by the upper-holding devices upon the surface of the insole, all substantially as and for the purposes described.

3. The combination of the last, the jack having a horizontal movement in relation to the upper-holding devices, the upper-holding devices, one arranged in advance of the other, and the lasting-plates secured to the bed, having a horizontal movement, whereby upon a movement of the last horizontally in one direction the upper is clamped to the edge of the last at the toe or heel, and by the continued horizontal movement in the same direction its edge is folded upon the surface of the insole, all substantially as and for the purposes described.

4. In a machine for lasting the uppers of boots and shoes, the combination of the last, a jack for supporting it, the toe or heel folding plates, and a gang or group of fastening-driving devices supported and adapted to be positioned by the movement of the lasting-plates, all substantially as and for the purposes described.

5. In a lasting-machine for lasting the toes and heels of boots and shoes, a revolving jack having a horizontal movement, a last carried by said jack, and toe and heel lasting devices arranged at opposite ends of a bed or table and adapted to be used successively, all substantially as and for the purposes described.

6. In a lasting-machine, toe and heel lasting devices arranged at opposite ends of a bed or table and adapted to be used successively in lasting the toe and heel of a boot or shoe, all substantially as and for the purposes described.

7. In a lasting-machine, the combination of radially-converging folding-plates, a group of nail-drivers carried by suitable arms or supports which are adapted by mechanism, substantially as described, to be moved to a position coincident with the plates, and tack or nail strip feeding mechanism, as set forth.

GEO. W. COPELAND.
MATTHIAS BROCK.
JOS. E. CRISP.

Witnesses:
F. F. RAYMOND, 2d,
W. C. FOGG.

122

(No Model.) 4 Sheets—Sheet 1.

N. LOMBARD.

LASTING MACHINE.

No. 524,445. Patented Aug. 14, 1894.

Fig. 1.

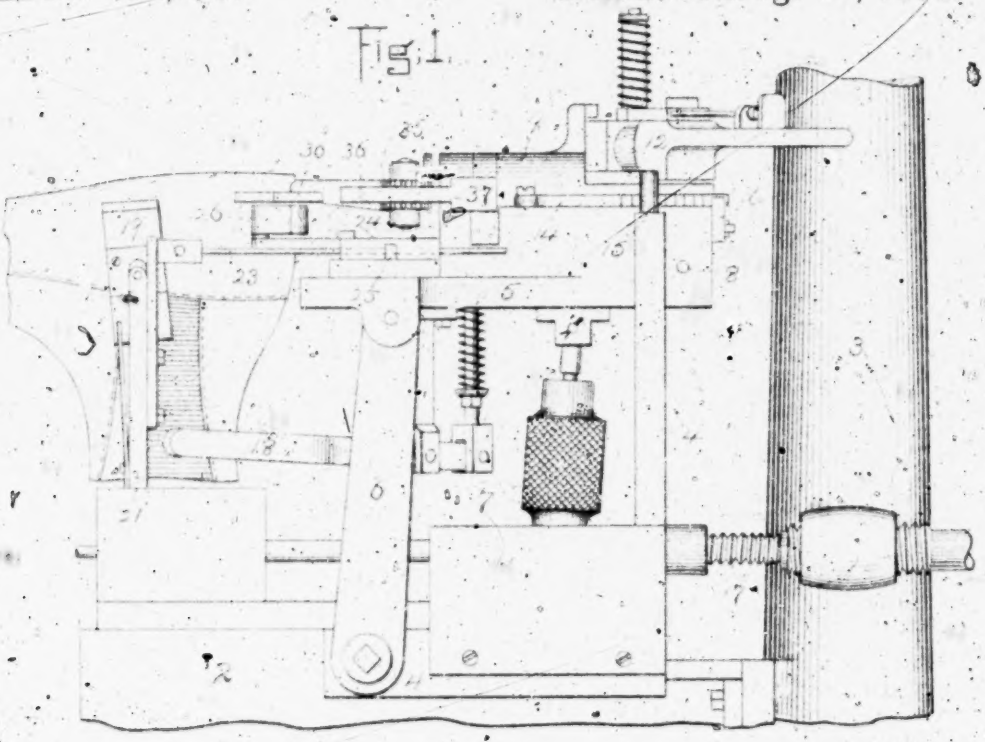
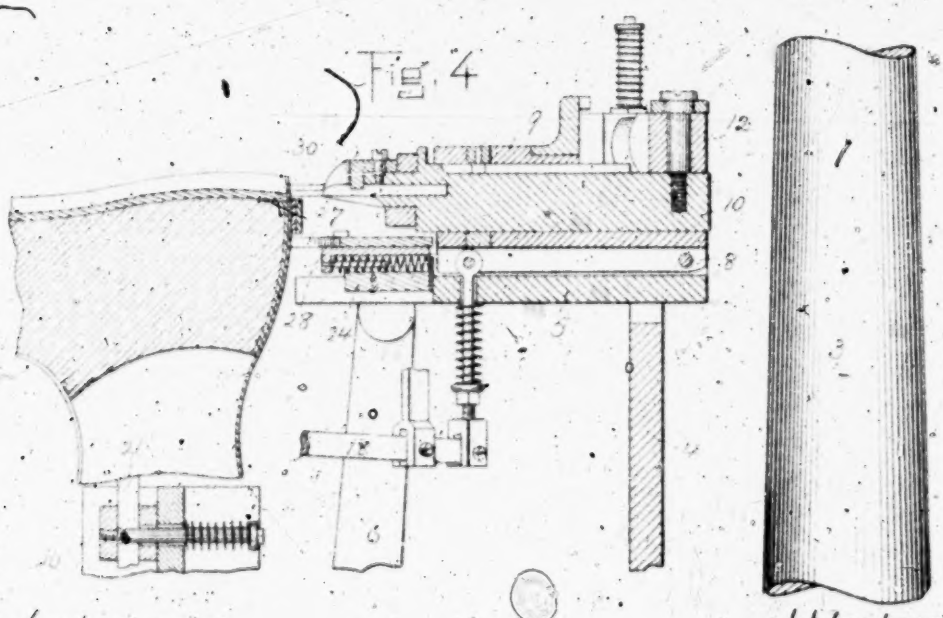


Fig. 4.



WITNESSES.

Francis E. Hanwood

Geo. F. Wood.

INVENTOR.

Nathaniel Lombard.

by H. E. Ds. Lodge Atty

124

(No Model.) 4 Sheets—Sheet 2.

N. LOMBARD.

LASTING MACHINE.

No. 524,445. Patented Aug. 14, 1894.

Fig. 2.

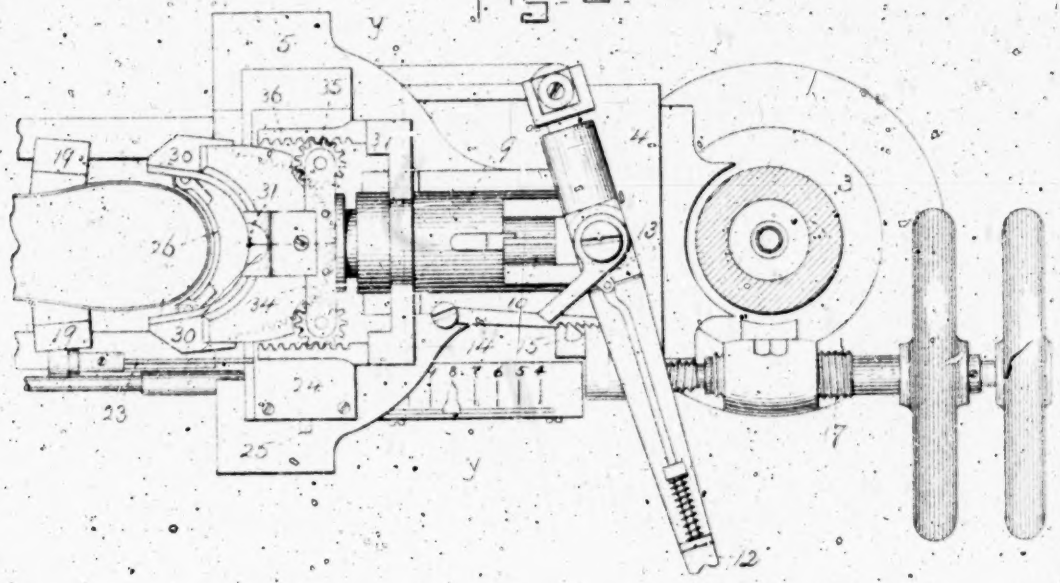
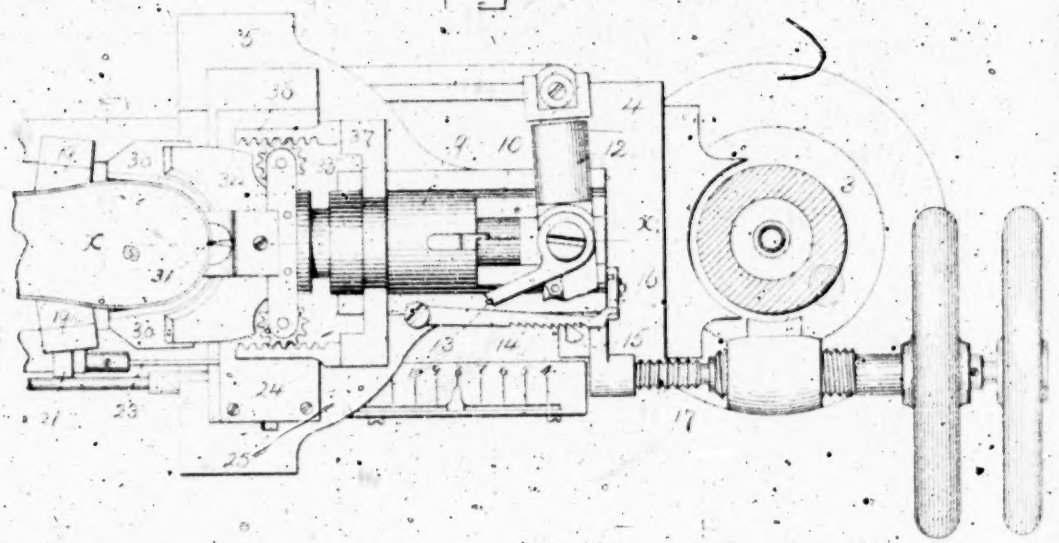


Fig. 3.



WITNESSES.

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By H. L. Lodge Atty

(No Model.) 4 Sheets—Sheet 3.

N. LOMBARD.

LASTING MACHINE.

No. 524,445. Patented Aug. 14, 1894.

Fig. 5

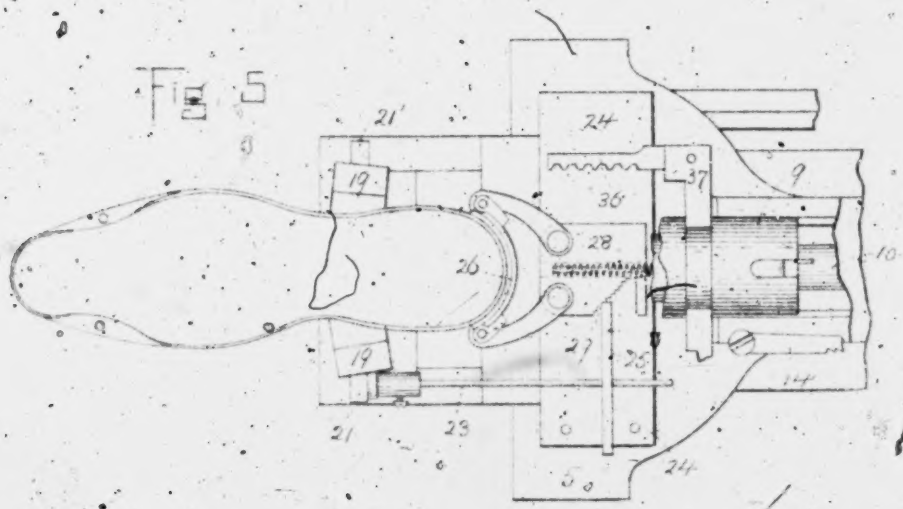
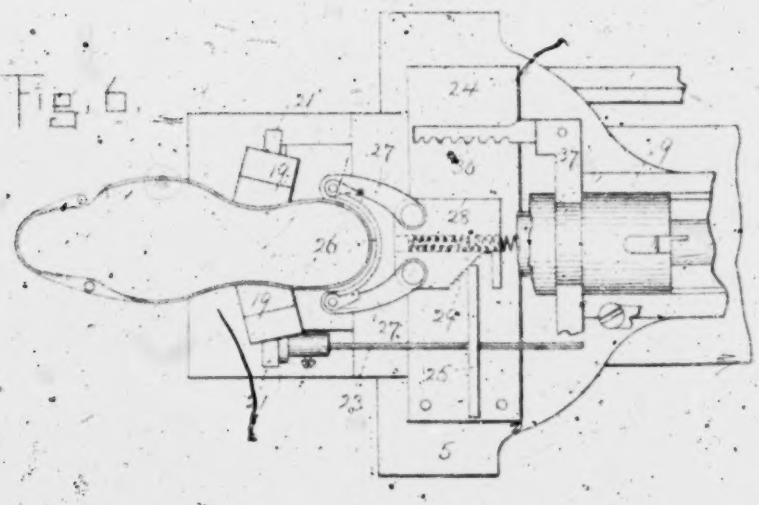


Fig. 6.



WITNESSES.

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By H. C. Fenger Atty.

. 128

(No Model.) 4 Sheets—Sheet 4.

N. LOMBARD.

LASTING MACHINE.

No. 524,445. Patented Aug. 14, 1894.

Fig. 8.

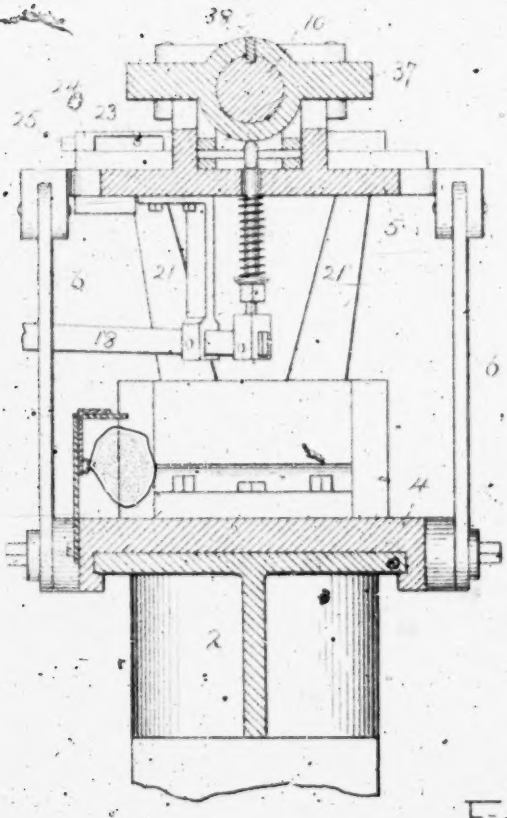


Fig. 7

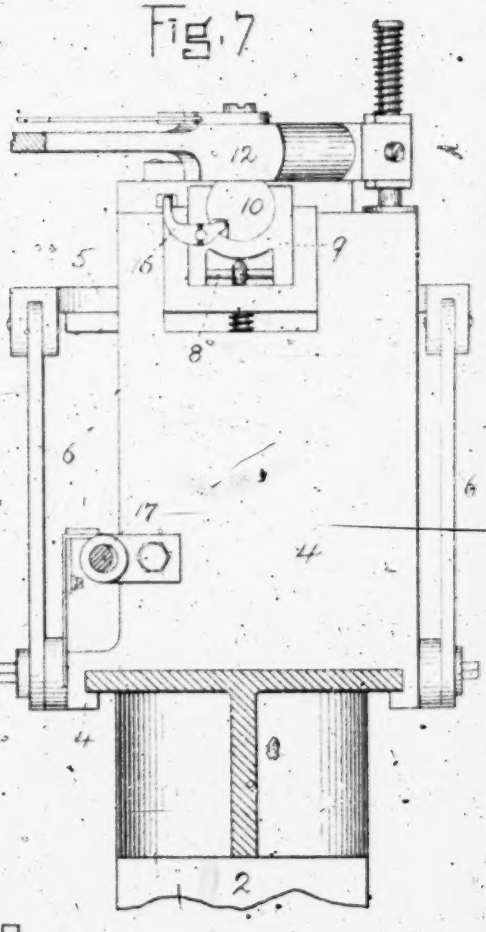
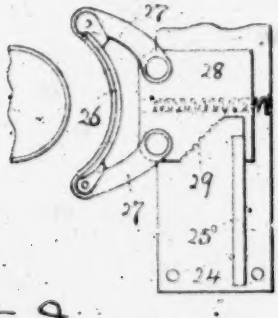


Fig. 9.



WITNESSES:

Francis E. Steward

Geo F. Wood

INVENTOR.

Nathaniel Lombard.

By Hoyt & Lodge Attys

UNITED STATES PATENT OFFICE

NATHANIEL LOMBARD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AUTOMATIC LASTING MACHINE AND MANUFACTURING COMPANY, OF PORTLAND, MAINE.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,445, dated August 14, 1894.

Application filed November 10, 1893. Serial No. 490,580. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL LOMBARD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Heel-Lasting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to lasting machines particularly that portion which includes mechanism for operating upon the heel upper and comprising the several acts of drawing the upper snugly about the last, and crimping and folding it down upon the insole.

My invention in brief consists in a sliding heel carriage upon which are mounted the various elements, which when assembled constitute the machine, as an entirety.

The primary features consist in a rocking cylinder adapted to swing in line with the longitudinal axis of the last, and likewise in a piston adapted for reciprocating and oscillating movement within the cylinder. Said piston is furnished with folding wipers and these are controlled by the same lever by which the various motions are imparted to the piston.

Furthermore my invention is embodied in the employment of a pair of last-holding devices by which the last proper is supported along the quarter and in a sliding plate fitted with a flexible clamping band for temporarily securing the heel portion of the upper against the last.

One of the most important and characteristic features in my present invention comprises mechanism for automatically adjusting the position of the wipers to the varying contours of the heels of boots or shoes, since it is necessary that said wipers shall approximately coincide with the heel at all points, when contiguous thereto, and just prior to the act of lasting the heel portion. This mechanism in brief consists in a variable stop or bolt, which is changed in position dependent upon the size of the last entered for lasting. Furthermore this stop controls and regulates the distance of the table from the heel portion of the last, after the flexible clamping band is set tightly against the heel. Hence, as the distance of the carriage and the wipers are nearer or farther from the heel, so are the wipers less contracted or more contracted at the time they touch the heel in readiness to perform their duty, since the piston must be moved to bring the wipers about the heel, and such movement acts to fold them toward each other. This mechanism more particularly and in detail consists of a bolt which is positioned transversely on the movable table in the rear of the last and is arranged to engage a plate with a notched edge obliquely of the bolt. Moreover this plate carries the flexible clamping band and slides to and fro with respect to the heel in alignment with the longitudinal axis of the last. Thus it will be understood that the distance between the last-holding devices controls the inward or outward movement of the bolt, while the position of the latter regulates the throw of the table with respect to the flexible clamp. Hence, the table is stopped in some instances sooner than in others and as a result the piston has a greater distance to travel before the wipers reach the heel; consequently the wipers are contracted to a greater extent and are thus adapted to fit a small heel, conversely with a larger heel. Since the position of the bolt is changed for different sizes of shoes, it is evident that the wipers are automatically adjusted for each and every size.

The drawings accompanying this specification represent in Figure 1 a side elevation of heel-lasting mechanism embodying my invention. Fig. 2 is a plan showing the flexible clamping band against the heel with the wipers retracted. Fig. 3 is a similar view with the wipers in readiness to advance over the heel. Fig. 4 is a vertical section on line $x\ x$ in Fig. 3. Fig. 5 is a plan of the machine with the wipers removed showing the transverse bolt and notched plate for automatically adjusting the position of the wipers. Fig. 6 is a similar view showing the changes relatively of the several parts when lasting a small

shoe. Fig. 7 is an end elevation of the machine. Fig. 8 is a vertical cross section on line *y y* in Fig. 2. Fig. 9 shows the normal position of the bolt and notched plate prior to clamping the flexible band against the heel.

In said drawings 2 represents the main standard or frame of the machine fitted with an upright post 3 and a sliding carriage upon which are mounted the principal operating elements. Said carriage consists of a base and a vertical end piece 4 which engage the standard, while a top plate or table 5 is positioned above and united thereto by pivotal supports 6 6. Furthermore an adjusting screw-threaded sleeve 7 serves to give the proper angle to said table 5 with respect to the last. Mounted upon the table 5 and pivoted at 8 is a cylinder 9 adapted to rock in a plane coincident with the longitudinal axis of the last; swinging of the cylinder is produced by aid of the lever 12 which raises or lowers the free end. A piston at 10 is contained within the cylinder and by means of the operating lever 12 may be caused to reciprocate or oscillate as circumstances require. The cylinder and table 5 move in unison toward or away from the last, and such movement is effected with the lever 12 and a spring-actuated pawl 13 which engages said cylinder. The purpose of the swinging motion of the cylinder is to raise or lower the wipers with respect to the top of the heel, and the spring at the end of the lever 18 serves to force the wipers against said heel and break and flatten down the upper. A toothed rod 14 serves to lock the table 5 in proper position by aid of the stop 15, while disengagement of the two is effected by the piston which is rocked slightly to operate a latch 16, see Fig. 7, and separate the rod 14 from the stop, and so permit the table 5 to slide back.

Change in the position of the entire carriage is effected by the agency of the screw rod 17 and after said carriage has once been positioned, so it continues for the same size of shoe. In connection with the act of lasting I provide two lateral last-holding devices 19 adapted to grip the upper at or near the quarter and these devices likewise clamp the counter at its corners, said devices being loosely hung upon a pin 20, see Fig. 4, furnished with a coiled spring in order to provide for variable adjustment of said devices to allow them to yield as the flexible clamp thrusts the last forward until the toe meets the stop. This obviates the restrictions of a rigid joint which otherwise might cause folds in the leather. From the lever-bar 21 of one of these holding devices and adjustably secured thereto is a rod 23 which is parallel with the longitudinal axis of the last and projects through a hollow rectangular box 24 bolted to the table 5 of the carriage. Transversely of this rod is secured a bolt 25 which is contained within the box, the rod 23 sliding freely through said bolt. From the above description of said elements it will be evident that according to the movement of the last-holding devices 19 toward or from each other, so will the bolt 25 approach or recede from the median line or a plane coincident with the longitudinal axis of the last. Hence the extremity of the bolt is positioned in accordance with the size of the last and is changed in or out from the median line according to the size of shoe introduced between the last-holding devices.

In the act of lasting the heel of a boot or shoe it has been customary to employ a flexible clamp, such as is shown at 26, see Figs. 5 and 6. In the present instance the ends of this clamp are secured to similar arms 27 affixed to a sliding plate 28, this latter being contained within the box 24 before mentioned. One side of the plate is formed with a V notch while one edge of said notch is toothed or serrated at 29 to serve as variable contact points for the bolt 25. Normally said plate is held in a forward position or advanced toward the last, see Fig. 9, by a spring in order to give free play to the movement of the bolt within the box when the last is introduced.

To seize the edge of the heel upper and force and fold it over the insole, wipers 30 are likewise provided, these, as shown in Figs. 1 and 4, are positioned somewhat above the flexible clamp; their center of motion is the point 31; while the wipers consist of curved jaws their exterior rear curved peripheries being toothed as shown. In order to impart a scissor-like wiping motion to these instrumentalities a transverse arm 34 is secured upon the piston and at each end is mounted a revoluble pinion 35, these latter meshing in racks 36 which form parts of a yoke 37. This yoke is made fast to the cylinder hence reciprocations of the piston cause rotation of the pinions, and an open and shut movement of the wipers is effected. The yoke is connected to the piston by a pin 38, while the piston is slotted, and thus the yoke may be rocked while the piston can reciprocate freely through it.

In connection with the movement of the wipers and the adjustable position of the bolt 25 dependent upon the size of the last is embodied the chief and most characteristic feature of my invention, whereby the relative position of the wipers is automatically regulated, and consequently such, when in readiness to pass over the leather of the upper, are practically of the same conformation as the contour of the heel. In other words they will touch the heel at all points and such adjustment is effected when the wipers approach the heel, the space between said wipers being increased or diminished according to the size of the last then just entered for the purposes of lasting. I shall now explain this adjustment more fully, reference being had particularly to Figs. 2, 3, 5, 6, and 9.

It is to be understood that the position of the last-holding devices 19 and the rod 23 together with the inner extremity of the bolt 25 are practically fixed points for each size of shoe. Further that the box 24 is fastened to the table 5 of the carriage, while the wipers are free to reciprocate above. With these premises I will say that the last in Fig. 9 is placed in position and the holding devices 19 brought tightly thereagainst thus adjusting the bolt to the position shown. Moreover the plate 28 is in the position shown in Fig. 9 the flexible clamp 26 not being in contact with the heel. This plate has free independent movement of its own although it moves with the carriage. The handle 12 is now grasped, the catch 13 moves to interlock with the cylinder, and the table 5 and all the elements thereupon are advanced, this includes the cylinder, piston, box 24, the bolt 25 and the plate 28 with the clamping band 26, as likewise the wipers. This upper part of the carriage or table 5 swings now upon the arms 6 6 until the band 26 contacts against the heel, when the plate 28 becomes stationary, while the said table 5, bolt 25, and the other co-operating elements still advance, the bolt engaging the serrated edge and forcing the plate 28 and band 26 tightly against the heel. The table 5 of the carriage is now locked in position by means of the toothed bar 14 and stop 15 while the act of lasting now is to take place. The operator is then in readiness to release the catch 13 from the cylinder, and this done he proceeds to move the piston, and this agent now acts to cause the wipers to close together by aid of the pinions and the toothed racks. Oscillating movement may also be given to cause the wipers to break and flatten down the upper upon the insole. This oscillation affects the piston, wipers and their actuating elements, to wit:—the pinions and toothed racks, the latter forming part of the yoke 37.

From the above description it will be observed that the wipers do not advance and consequently do not change their position relatively to each other until the clamping band 26 is firmly locked against the heel. This forcing home of the band 26 will, it is seen, take place at different times consequent upon the position of the bolt 25 with respect to the serrated edge 29 of the plate 28. That is, in some instances when the shoe is small, the bolt, extending farther in, will engage the plate sooner, the result being that the carriage and wipers are not permitted to advance so near to the heel, as when a larger shoe is in process. But inasmuch as the wipers are farther from the heel in a small shoe the piston is required to travel a longer distance and thus the wipers are more contracted when they reach the heel than when a larger size shoe is in process. In the latter example the bolt being more retracted the carriage, wipers and piston are allowed to approach nearer the heel and are closer to the heel at the time the bolt engages the plate 28 which act serves to set the band 26 firmly against the heel. Hence it will be understood that the piston moves only a short distance before the wipers reach the upper, as a consequence they are wider apart, but in any event they always approximate in shape the heel to be lasted, since the bolt and the serrated edge of the plate 28 are adjusted relatively to produce this result. Hence large or small, narrow or wide, as the last may be, the wipers are automatically adjusted to conform to the heel contour when contiguous thereto and this adjustment takes place every time a last is entered, since the bolt is advanced or withdrawn, while the variable stop thus created changes the position of the carriage from the heel and the wipers are being adjusted, while the piston is being advanced; hence they reach the heel in a position which causes them to touch, at all points of the heel simultaneously. The advantage attending this adjustment of the wipers are evident: All springs are obviated, while each change is effected positively and without thought from the operator. Heretofore the wipers required constant individual attention.

What I claim is—

1. In a lasting machine the combination with a heel-clamp, and lasting wipers, of a bolt for variable adjustment, levers to grasp the last, and connections from the levers to the bolt, whereby insertion of the last between said levers automatically adjusts the bolt which regulates the movement of the wipers and causes them to reach the heel in a more or less contracted position, substantially as and for purposes explained.

2. In a lasting machine the combination with last-holding levers, and a bolt carried thereby, of a notched plate adapted to reciprocate to and fro with respect to the last, a heel clamp affixed to said plate, a pair of folding wipers, and means to bring the bolt against the said plate and thus regulate the position of the wipers at the time of contact with the heel, substantially as set forth.

3. The combination with a lasting carriage, a pair of folding wipers, and a bolt mounted on the carriage but adjustable transversely to and fro of the median line of the last and regulated by the size of the last, of a toothed plate independently movable to engage the bolt, a pair of folding wipers, and mechanism to bring the bolt in contact with the toothed plate to stop the carriage and thus regulate the position of the wipers when they reach the heel, substantially as described.

4. In combination with last-holding levers, a carriage to support lasting appurtenances, a bolt transversely of the last and mounted on said carriage, a rod extending through said bolt and attached to a last holding lever, a heel clamp, and a toothed plate, the latter to engage the bolt which serves as a variable stop for the carriage, substantially as specified.

5. In a lasting machine the combination with a movable carriage, a sliding piston thereon, folding wipers actuated by the piston, and a bolt adjustable transversely with respect to the last, of a pair of last-holding levers, a rod to connect the bolt therewith, a heel clamp, a spring-actuated toothed plate having independent movement on the carriage, and means to advance the carriage and cause the bolt to engage the toothed plate, substantially as set forth.

6. In a lasting machine the combination with a movable carriage, a rocking cylinder, a piston to reciprocate therein, and a pair of folding wipers actuated by the reciprocations of the piston, of a sliding plate having movement independent of the carriage, a heel clamp affixed thereto, and a bolt transversely on the carriage and serving to contact with the plate to produce variable throw for the wipers, substantially as explained.

7. In combination with a movable carriage, and stationary last-holding levers, a bolt transversely of the last, mechanism interconnecting said levers and bolt by which said bolt moves simultaneously with said levers, a sliding plate carrying a heel clamp, and means to cause the bolt to contact with the plate at points varying in distance from the median line of the last to limit the travel of the carriage toward the heel of the last, substantially as specified.

8. In a lasting machine a movable table, means for locking the same, a rocking cylinder, a piston thereon, and a pair of folding wipers at the extremity of said piston, combined with a yoke the arms of which have rack-teeth, revoluble pinions which interconnect said rack and wipers, and a lever to reciprocate the piston, substantially as stated and set forth.

9. In a lasting machine, a movable carriage, means for moving and locking the same, a pair of folding wipers, a heel-clamp upon the carriage to serve as a stop, a pair of last-holding levers, and mechanism which interconnects the last-holding levers with the heel-clamp, and thereby limits the travel of the carriage toward the heel, such travel to be dependent upon the varying width of the last at its point of contact with the last-holding levers, substantially as described.

10. In a lasting machine the combination with a sliding carriage, its upper table 5, the swinging cylinder, and reciprocating piston notched at one end and furnished with lasting appurtenances at the opposite end, of a toothed bar, a stop, and a latch which engages the piston and upon oscillation of the piston separates the bar from the stop to release the table 5, substantially as explained.

11. In combination a movable table, a swinging cylinder thereupon, a piston, its lever, means to advance the cylinder and piston together or the piston alone, wipers carried upon and actuated by the piston, a toothed plate movable on the table, and a heel clamp secured to the toothed plate, together with a bolt carried on the table, and means for adjusting the bolt transversely with respect to the longitudinal axis of the last, said adjustment to be dependent upon the width of the shoe then in process of lasting, substantially as stated.

In testimony whereof I affix my signature in presence of two witnesses.

NATHANIEL LOMBARD.

Witnesses:
H. E. LODGE,
FRANCIS C. STANWOOD.

(No Model.) 2 Sheets—Sheet 1.

A. W. EATON.

LASTING MACHINE.

No. 596,323. Patented Dec. 28, 1897.

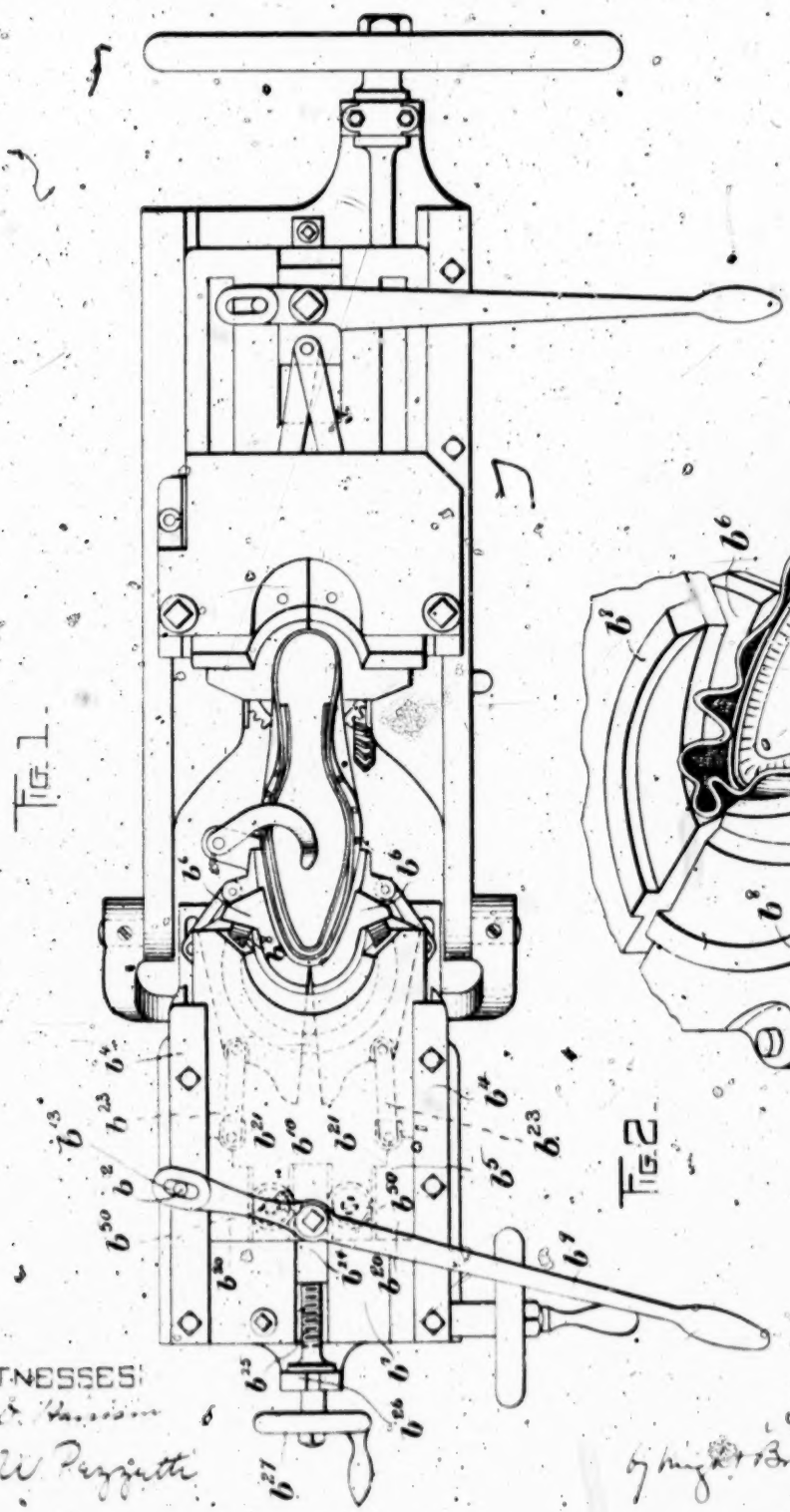


FIG. 1.

FIG. 2.

WITNESSES:

INVENTOR:

(No Model.) 2 Sheets—Sheet 2.

A. W. EATON.

LASTING MACHINE.

No. 596,323. Patented Dec. 28, 1897.

FIG. 3.

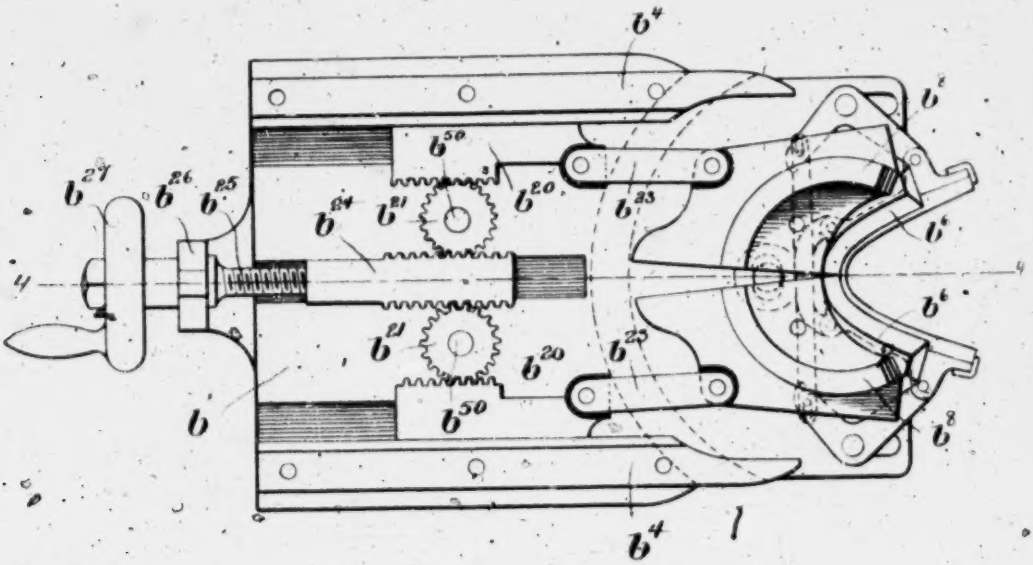
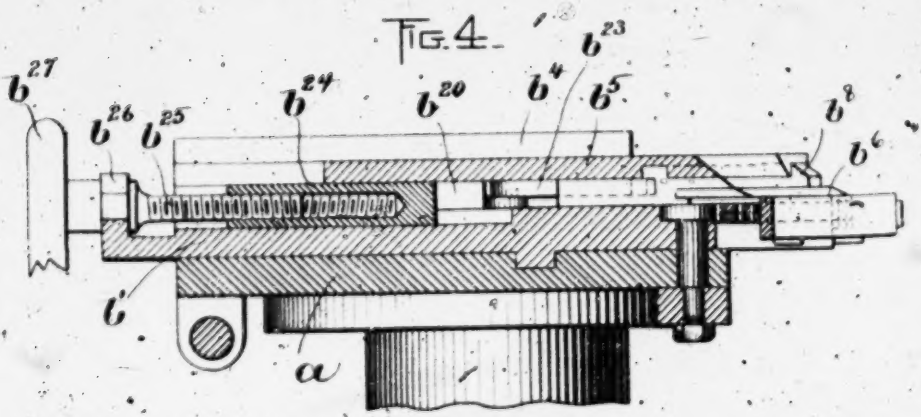


FIG. 4.



WITNESSES:
F. D. Harrison
P. W. Pezzetti.

INVENTOR:
A. W. Eaton
by Wright Brown & Quinby
Attys

UNITED STATES PATENT OFFICE.

ARTHUR W. EATON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE SEAVER PROCESS LASTING COMPANY, OF SAME PLACE.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 596,323, dated December 28, 1897.

Application filed November 11, 1896. Serial No. 611,690. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. EATON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Lasting-Machines, of which the following is a specification.

This invention relates to machines for wiping over the heel and toe portions of a boot or shoe upper upon the last upon which the upper is lasted; and it has for its object to provide improved means for adjusting and operating the wipers, which move forward in the direction of the length of the last and at the same time swing inwardly in opposite directions crosswise of the last.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, Figure 1 represents a top plan view of a lasting-machine provided with my improvements. Fig. 2 represents a perspective view showing a portion of a last and the upper thereon, together with the toe-wipers. Fig. 3 represents a top plan view of a part of the machine, the wiper-carrier being removed to show the mechanism below it. Fig. 4 represents a section on line 4 4, Fig. 3.

The same letters of reference indicate the same parts in all of the figures.

In the drawings, b' represents a base or support for the wiper-carrier b^5, the wipers b^6, and the wiper-operating mechanism hereinafter described. The base or support b' is preferably pivotally connected with a fixed bed a, so that the path of movement of the wipers may be varied to suit either right or left lasts. This feature, however, is not a part of my invention.

The base or support b' is provided with guides b^4 b^4, between which is fitted the slide or carrier b^5, with which the toe-wipers b^6 b^6 are connected. The said wipers have segmental ribs b^8 b^8 engaged with segmental slots in the carrier b^5, said ribs and slots causing the wipers to swing in circular arcs when the wipers are pressed forward.

b^{20} b^{20} represent sliding racks fitted to move in guides on the base b' and meshing with pinions b^{21} b^{21}, which are provided with studs b^{50}, fitted to rotate in bearings formed in the carrier b^5. Said racks are connected by links b^{23} with the wipers b^6. The pinions b^{21} mesh with a sliding rack b^{24}, which has a screw-threaded socket meshing with a screw b^{25} which is journaled in a bearing b^{26} on the base b' and has a hand-wheel b^{27}. When the screw b^{25} is rotated, it causes an adjustment of the wiper-plates toward or from each other as hereinafter explained. When the carrier b^5 is moved endwise by the lever b^9, (the rack b^{24} remaining stationary,) the pinions b^{21}, moving forward with the carrier, roll on said stationary rack and impart an accelerated forward movement to the racks b^{20}, this motion being due to the bodily movement of the pinions b^{21} with the carrier b^5 and to the rotation of the pinions on their own axes caused by their engagement with the rack b^{24}. This motion is imparted to the wipers b^6 by the links b^{23}, the wipers being thus caused to move forward with the carrier and to swing inwardly toward each other, the segmental ribs b^8 moving in the segmental slots of the carrier, constituting pivotal connections between the carrier and wipers.

The described forward and inward movements of the wipers cause them to properly wipe the upper over upon the bottom of the last, the toe portion being wiped backwardly or lengthwise of the last, while the side portions are wiped inwardly or crosswise of the last.

It will be seen that the adjustability of the rack b^{24} by means of the screw b^{28} enables the operator to adjust the wipers by swinging them toward or from each other before moving them forward by advancing the carrier b^5. The wipers may be thus adjusted to lasts of different widths and shapes and may be caused to swing inward over the bottom of the last to any desired extent. The screw b^{25} holds the rack b^{24} at the desired adjustment, and when the carrier b^5 is moved forward the wipers are swung inwardly from the point to which they were adjusted by the said rack and screw. I have therefore provided means for adjusting the wipers toward and from each other before giving them the combined forward and inward movement which wipes the upper over upon the last.

The segmental ribs b^6 on the wipers and the segmental slot in the carrier b^5, receiving and guiding said ribs, may be termed "interlocked parts" or "guiding members," constituting a pivotal connection between the wipers and carrier, said connection being strong and effective. The relative positions of said members may be reversed, the wipers being provided with segmental slots and the carrier with a segmental rib.

It is obvious that the above-described improvements may be used in connection with wipers formed to wipe over the heel portion of an upper. The carrier-operating lever b^9 is pivoted at b^{10} to the wiper-carrier b^5 and is engaged with the adjustable bed b' by means of a pin b^{12} and a slot b^{13}.

It will be seen by reference to Fig. 3 that the inner ends of the operative edges of the wipers meet at the center on which the wipers oscillate. The object of this arrangement is to prevent any opening between the inner ends of the wipers into which the upper-leather may be inserted. By thus excluding the leather from between the inner ends of the wipers I prevent any liability of cutting or marring the leather, which liability would exist if an opportunity were presented for the leather to find its way between the inner ends of the wipers. I also obtain a practically-continuous wiping edge acting alike on the center of the toe of the upper and on the side portions.

I claim—

1. In a lasting-machine, a toe or heel lasting-mechanism comprising a base or support, a carrier movable thereon, devices for moving the carrier, wipers pivotally connected with the carrier, mechanism operated by movements of the carrier for giving the wipers an accelerated motion, and wiper-adjusting devices coöperating with said mechanism, said devices being independent of the carrier-moving devices.

2. In a lasting-machine, a toe or heel lasting-mechanism comprising a base or support, a carrier movable thereon, wipers pivotally connected with the carrier, pinions engaged with the carrier to move bodily therewith, an adjustable rack mounted on the base between the pinions and meshing therewith, and connections between the pinions and wipers whereby motion is imparted to the wipers.

3. In a lasting-machine, a toe or heel lasting mechanism comprising a base or support, a carrier movable thereon, wipers pivotally connected with the carrier, pinions engaged with the carrier to move bodily therewith, a rack secured to the base, and meshing with the pinions, sliding racks meshing with the pinions, and links connecting said racks with the wipers.

4. In a lasting-machine, a toe or heel lasting mechanism comprising a base or support, a carrier movable thereon, wipers pivotally connected with the carrier, pinions engaged with the carrier to move bodily therewith, a rack secured to the base, and meshing with the pinions, means for adjusting and positively holding said rack, and connections between the pinions and wipers whereby motion is imparted to the wipers.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of November, A. D. 1896.

ARTHUR W. EATON.

Witnesses:

A. D. HARRISON;

P. W. PEZZETTI.

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M. BROCK.

LASTING MACHINE.

No. 601,935. Patented Apr. 5, 1898.

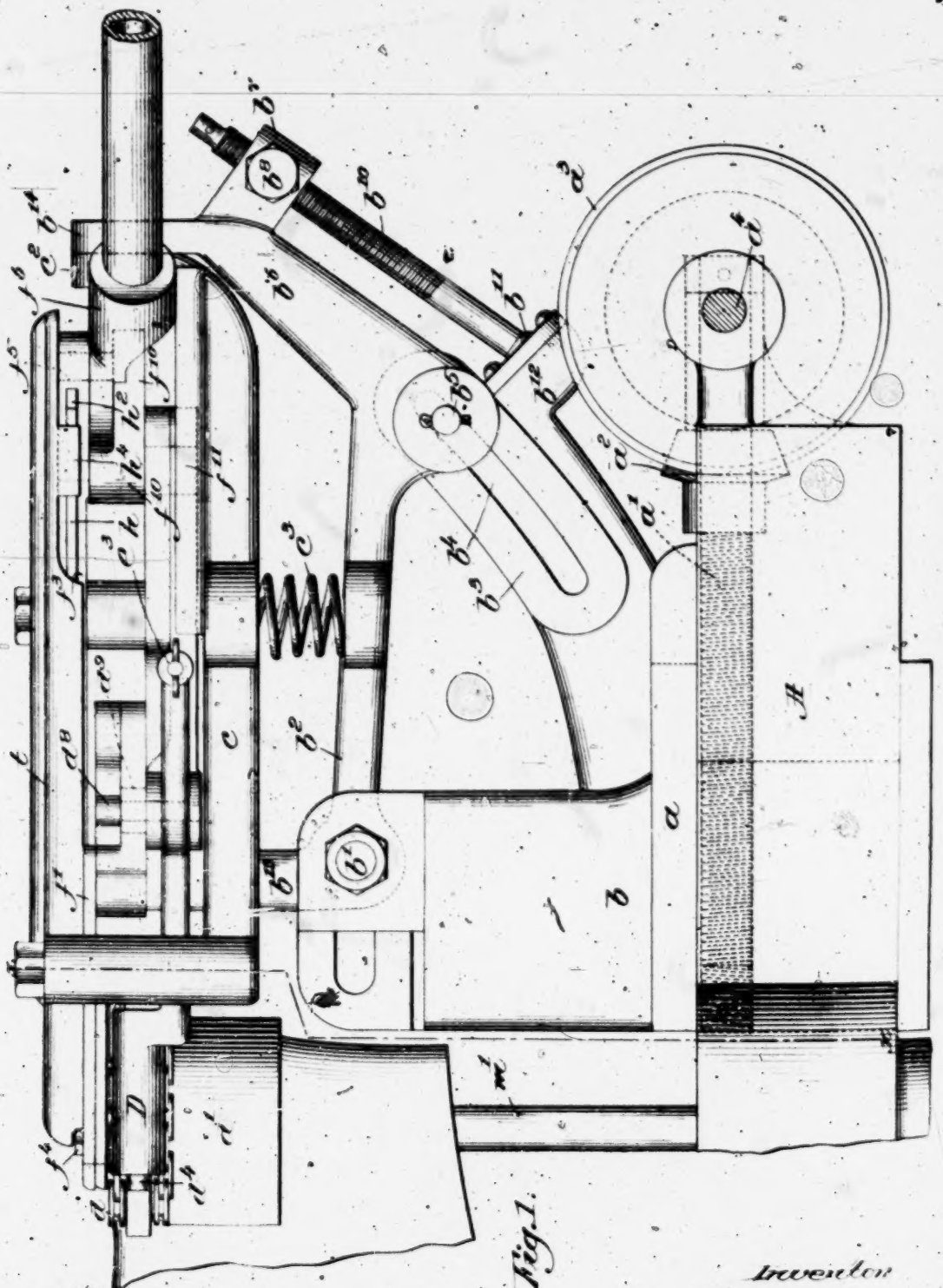


Fig. 1.

Witnesses.

Inventor
Matthias Brock

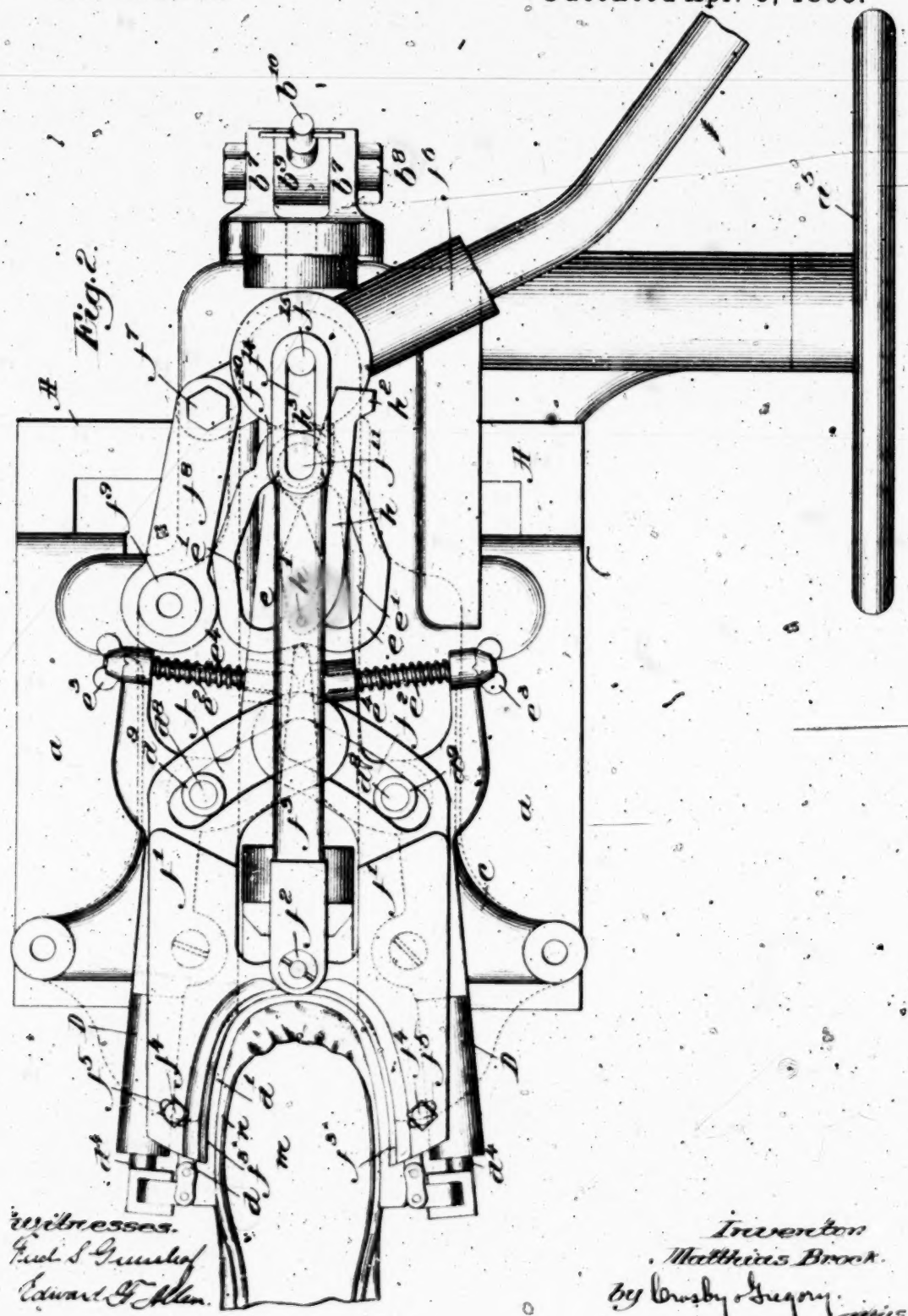
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M. BROCK.

LASTING MACHINE.

No. 601,935. Patented Apr. 5, 1898.

Fig. 2.



Witnesses.
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(No Model.) 6 Sheets—Sheet 3

M. BROCK.

LASTING MACHINE.

No. 601,935. Patented Apr. 5, 1898.

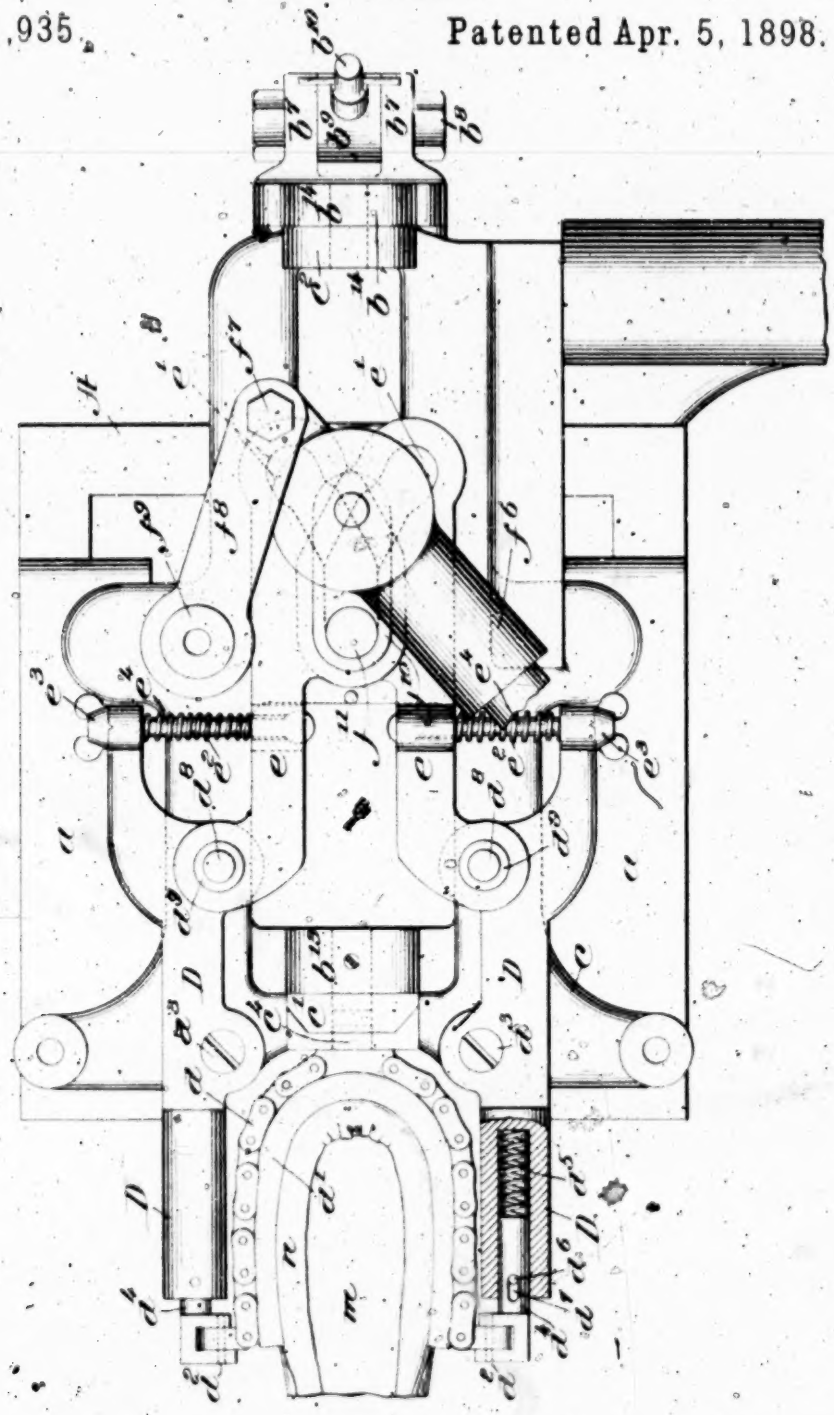


Fig. 3.

Witnesses.
Fred S. Gunby
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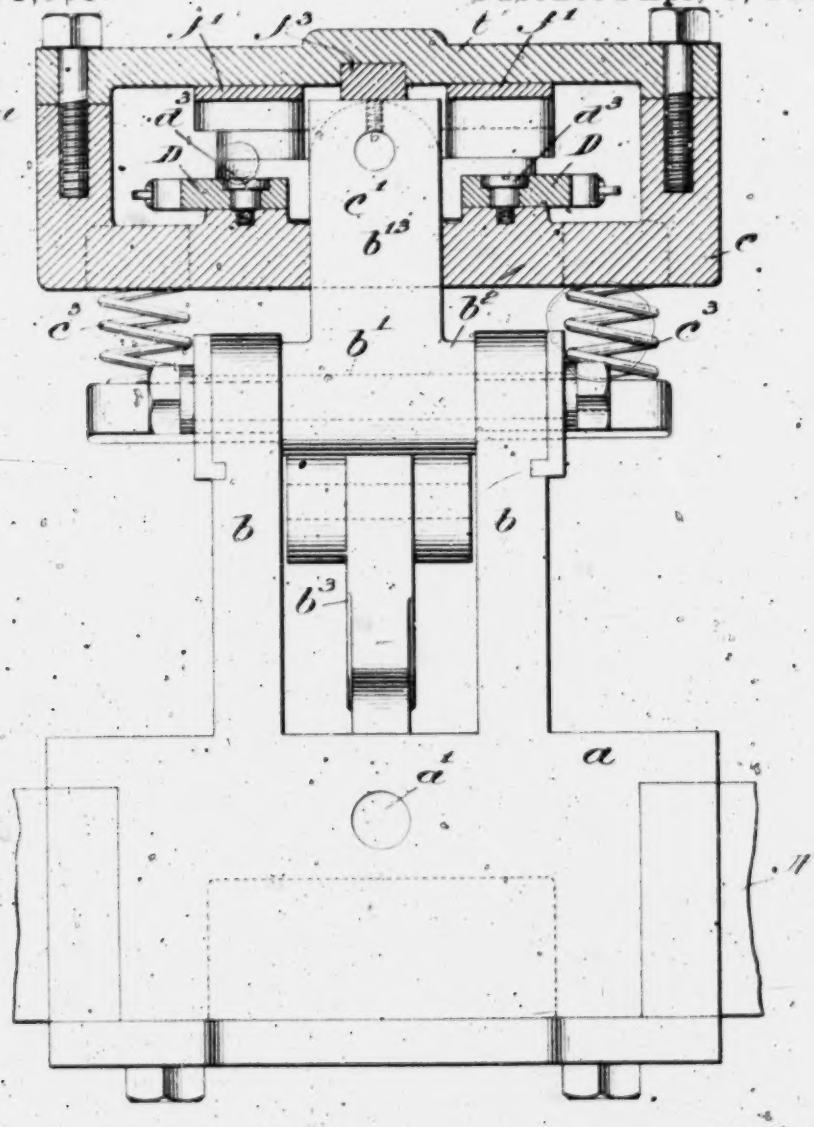
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M. BROCK.

LASTING MACHINE.

No. 601,935. Patented Apr. 5, 1898.

Fig. 3.



Witnesses.
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(No Model.) 6 Sheets—Sheet 5.

M. BROCK.

LASTING MACHINE.

No. 601,935. Patented Apr. 5, 1898.

Fig. 4.

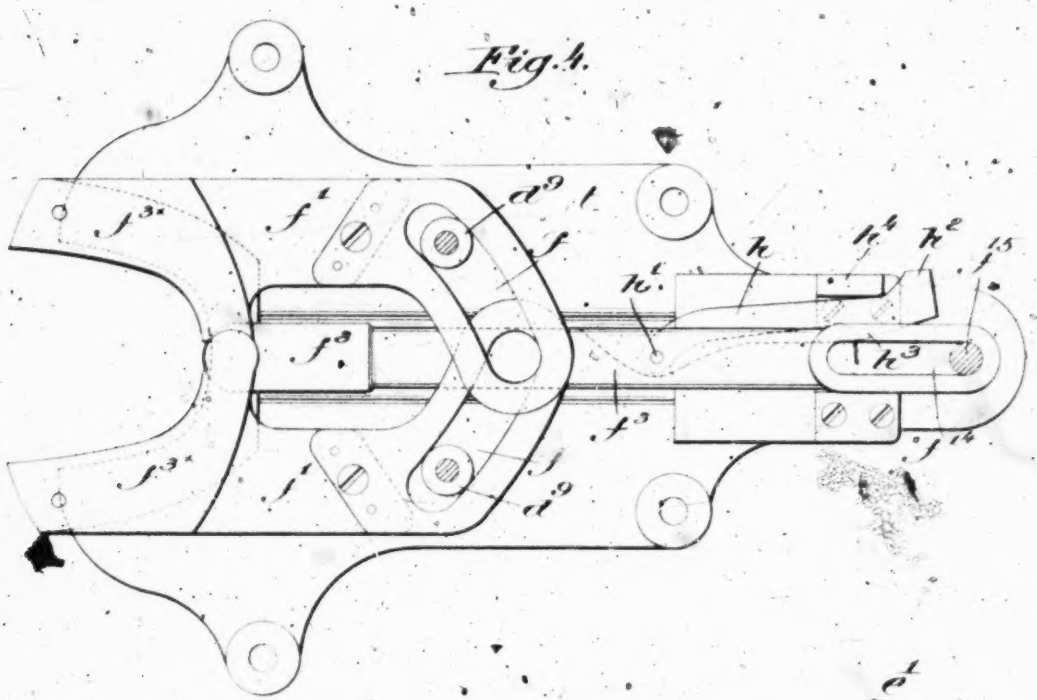


Fig. 6.

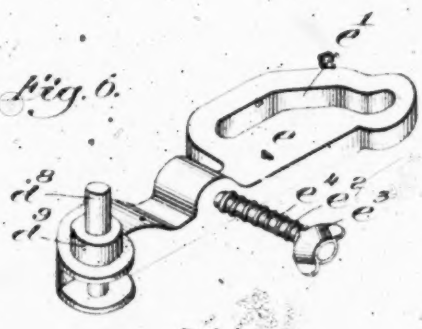
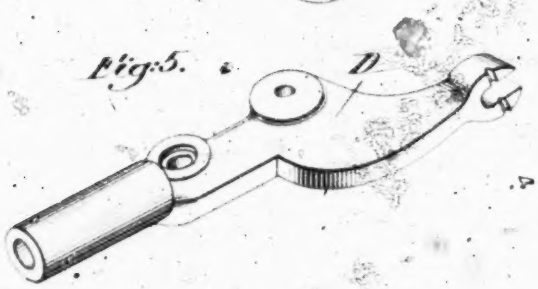


Fig. 5.



Witnesses.
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M. BROCK.

LASTING MACHINE.

No. 601,935. Patented Apr. 5, 1898.

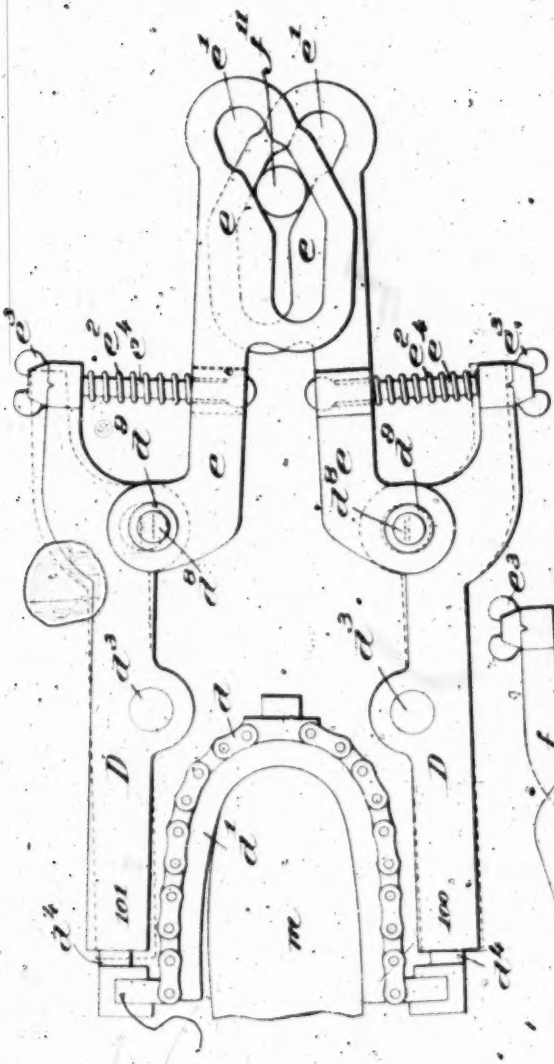


Fig. 7.

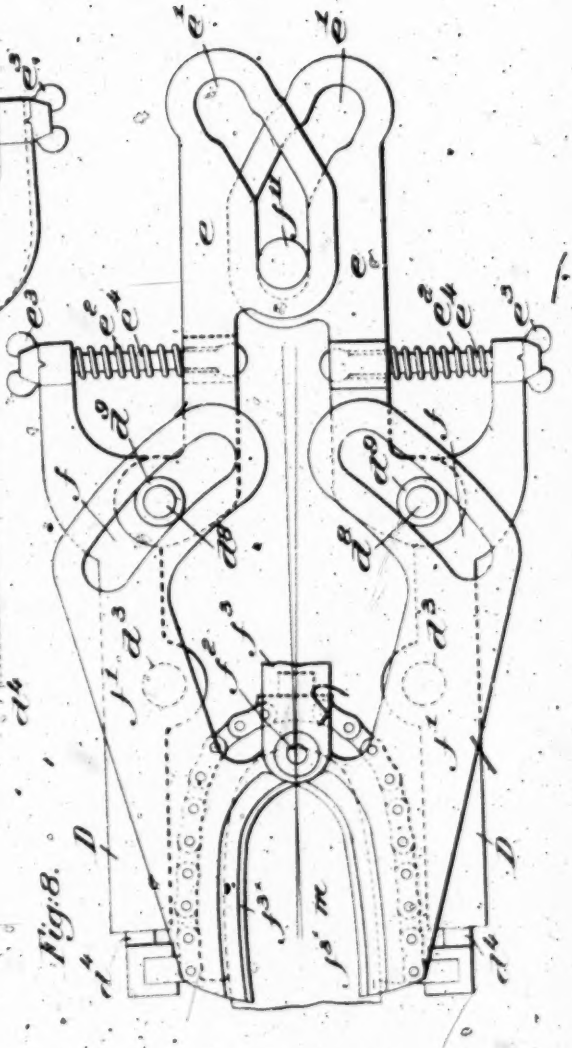


Fig. 8.

Witnesses.
Fred. L. Gunby
Edmund F. Allen

Inventor.
Matthias Brock.
by Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

MATTHIAS BROCK, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CONSOLIDATED & McKAY LASTING MACHINE COMPANY, OF PORTLAND, MAINE.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 601,935, dated April 5, 1898.

Application filed February 14, 1896. Serial No. 579,281. (No model.)

To all whom it may concern:

Be it known that I, MATTHIAS BROCK, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

My invention relates to lasting-machines of what is known as the "plate" or "wiping" type, wherein the leather or other material is wiped over and upon the last and the inner sole thereupon, as distinguished from what is known as the "step-by-step" type of machine, having nippers or pincers to grasp the material and pull or stretch it over and about the last.

Lasting-machines of the former or plate type are usually provided with heel and toe wipers in the form of wiping-plates, which prior to my invention have, so far as I am aware, been given a fixed and uniform relative opening-and-closing movement—that is, said wipers always start from the same relative positions and move into the same relative positions regardless of the shape, size, or width of the last. If a wide last is used, it is evident the wipers in their closing movement will meet the leather earlier in their movement and will therefore when stopped in their final position be farther inwardly from the outside or periphery of the last than when a small or narrow last is used. In other words, the wipers when fully closed over a wide last will cover and conceal more of the last and the leather laid over and upon the same than when closed to the same relative positions over a small or narrow last.

Since the uppers or vamps of boots and shoes are usually cut in such proportion to the lasts upon which they are to be arranged as will allow for lapping the edges of said vamps always the same distance over and upon the bottoms of their respective lasts, usually about five-eighths of an inch, it will be clear that the wipers when fully closed over and beyond the inturned edge of the vamp on a wide last will have to be returned or "backed off" farther to expose sufficient leather to receive the tacks than would be necessary with a narrow last.

As the lasts delivered to the operator of a lasting-machine are not of a uniform width, but always of constantly-varying widths, sizes, and shapes, the operator at the present time is required to spend much of his time in backing the wipers off and on and cannot be depended upon to always position them at the same distances in from the outside of the last, so that great lack of uniformity in the driving of the tacks is always found in practice. If the tacks are not driven uniformly in proper position, they will to a greater or less extent interfere with the subsequent sewing or nailing operations for securing the outer sole or heel in position.

The principal object of my invention is the production of a lasting-machine wherein the lasting devices, whether in the form of wiper-plates or otherwise and whether located at the heel, toe, or elsewhere, may be predeterminately positioned at the same distance from the outside of the last whatever be the shape, size, or width of the last. While it is not essential that this positioning mechanism be automatic in its action, yet I prefer that it be automatic, and in the subsequent specification and in the drawings I shall illustrate my invention in connection with an automatic mechanism.

My invention further comprehends various novel features of construction and operation relating, among others, to a yielding end clasp for the boot or shoe, made to yield in order that it may adapt itself to various shapes or sizes of heels or toes—such, for instance, as a full-rounded heel or a narrow tapering heel—without prior manual adjustment by the operator.

For the sake of clearness and simplicity I will illustrate and disclose my invention in connection with the lasting devices for the heel end of a boot or shoe; but it is to be understood that my invention is not limited to such devices alone, but is applicable to any other of the lasting devices of a machine, as will be apparent to those skilled in the art.

In the drawings, Figure 1, in side elevation, shows a sufficient portion of a lasting-machine

embodying my invention to enable the latter to be understood, the hand-wheel and its shaft being broken away; Fig. 2, a top or plan view of the parts shown in Fig. 1 with the top plate removed; Fig. 3, a plan view and partial section of the parts shown in Fig. 2 with the top plate and wipers removed, said view showing what I term the "positioning" devices and means for actuating the same; Fig. 3^a, a vertical section on the dotted line $x\,x$, Fig. 1, looking to the right; Fig. 4, a detail in under side view showing the wipers and actuator therefor. Fig. 5 shows in perspective detail one of the positioning members; Fig. 6, a similar view of one of the levers for actuating the positioning member; Fig. 7, a diagrammatical view illustrating the operation of the positioning devices, and Fig. 8 a similar view illustrating the change in position of the wipers by the positioning devices.

In the embodiment of my invention selected for disclosure of the same and shown in the drawings, A is a part of the column of the well-known McKay-Copeland machine, or it may be a part of any other suitable or desired support, it being provided, as herein shown, with suitable guideways for the sliding carriage a, made longitudinally adjustable in said guideways by a suitable adjusting-screw a', (shown in dotted lines, Fig. 1,) held against longitudinal movement at one end in the column and threaded to and in a stand b, bolted or otherwise secured to and movable with said carriage, said screw in the present instance being provided with a beveled pinion a^2, in mesh with a bevel-wheel a^3, fast on the hand-wheel shaft a^4, journaled in suitable bearings on the column and provided at its end in position convenient for the operator with a usual hand-wheel a^5. (See Fig. 2.)

The stand b, as herein shown, is provided with two vertically-extended arms horizontally slotted at their upper ends to receive the pivot-bolt b', upon which between the said arms is pivoted the plate-holder b^2, shown as slotted at its rear end at the right, Fig. 1, to receive the curved arm b^3 from the stand b, said arm b^3 being slotted, as at b^4, to receive a pin b^5 on the plate-carrier b^6, the latter being provided at its rear end with an upwardly-extended portion b^6, provided with two rearwardly-extended ears b^7, between which is pivoted on the bolt b^8 a nut b^9, (see Fig. 2,) tapped to receive the threaded end of an adjusting-screw b^{10}, suitably connected at its lower end, as by a universal joint b^{11}, with a lug b^{12} on the curved arm b^3 of the stand. By means of the adjusting-screw b^{10} the inclination of the plate-holder b^2 and the parts carried thereby may be adjusted to meet varying springs of last in well-known manner.

The plate-holder b^2 at its opposite ends is provided with vertically-extended ears b^{13} b^{14}, (see Figs. 1 and 3,) to which is pivoted to rotate about a longitudinal axis the plate c, the pivot-pins passing through suitable ears c' c^2, rising from said plate.

The plate c (see Figs. 1, 3, and 3^a) is shown as yieldingly supported against rotation about its longitudinal axis referred to by suitable springs c^3, interposed between the said plate at opposite sides its said axis and the plate-holder b^2.

To the front of the ear c' of the plate c, Fig. 3, I have secured in suitable manner, as by a screw c^4, the middle portion of the usual clasp-chain d, within which is arranged the flexible clasp d', adapted to embrace the heel end of the last with the material thereupon.

The ends of the clasp-chain d, and therefore the ends of the clasp secured thereto, are connected in suitable manner, as by the pins d^2, (shown in Fig. 3,) with the positioning devices D D, fulcrumed at d^3 upon the plate c, whereby the positioning devices, or either of them, in the present instance of my invention are operated or moved from and by the last through the medium of the heel-clasp d' and its supporting-chain.

As herein shown, the clasp-chain d is not rigidly connected with the positioning devices D D, but is connected at its opposite ends with the respective positioning devices through the medium of the sliding pins d^4, which carry the pins d^2 referred to, and which are arranged to slide longitudinally in suitable sockets in the ends of said positioning devices, springs d^5 inserted between the bottoms of the said sockets and the ends of the respective pins acting to press the latter normally into their outermost positions limited by the stop-pins d^6, passed through slots d^7 in the pins. When the clasp is moved forward in usual manner to embrace the heel end of the last with the leather or vamp thereupon, the springs d^5, by pushing outwardly upon the ends of the clasp, draw the latter tightly about the narrowest or most-tapering form of heel; but should a last be encountered having a full rounded heel said springs will compress sufficiently to enable the heel-clasp to automatically conform to the fuller heel. A heel-clasp embodying my invention is therefore yielding—that is, capable of automatically adapting itself to full rounded or thin tapering heels without attention on the part of the operator.

The positioning devices D at the sides of their fulcra opposite the points of connection with the heel-clasp have in the present instance of my invention jointed to them at d^8 one of the ends of the positioning-device-actuating levers e e, which (see Figs. 3 and 7) are provided with angular slots e', (shown in dotted lines, Fig. 3, and in full lines, Fig. 7,) said slots e' having each a longitudinal portion adjacent the points of connection of said levers with the positioning devices and a rear angular portion connected therewith, the angular portions of the two slots being extended in opposite angular directions, as shown. Springs e^2 are shown interposed between the

actuating-levers *e* and their respective positioning devices D, (see Fig. 2,) the springs being limited in their movement by suitable thumb-nuts e^3, threaded upon the ends of limiting-bolts e^2, carried by the actuating-levers *e* and extended through portions of the positioning devices D.

The pivot-pins d^8, by which the actuating-levers are connected with their respective positioning devices, are herein shown as vertically extended and provided with suitable rollers d^9, which enter the cam-slots *f*, Fig. 2, in the wiper-plate carriers *f'*, jointed at f^2 to the common actuator f^3, shown as a slide-bar, and provided at their inner ends with suitable wipers or wiper-plates $f^{3\times}$, adjustably secured to their respective carriers by the adjusting-screws f^4, passing through slots f^5 in the said carriers, although it is to be understood that it is within the province of my invention to form what I have denominated as the "wiper-plates" and their "carriers" integral instead of independent, as herein shown.

The slide-bar actuator f^3 is shown as held against lateral vibration or movement by a suitable guideway or recess in the under side of the top plate *t*, (see Fig. 3[4],) but is free to move longitudinally therein, said actuator at its rear end (see Fig. 2) being shown as slotted at f^{14} to receive the pin f^{15}, carried by the lever f^6, fulcrumed at f^7 to the free end of a link f^8, pivotally connected at f^9 to the plate *c*. The hand-lever f^6 at its under side is shown as jointed by means of the pin f^{15} to one end of a short link of f^{10}, Fig. 3, the latter at its opposite end being provided with a downwardly-projecting roller-stud f^{11}, which enters the cam-slots *e'* in the levers *e* referred to, so that in the present instance of my invention the hand-lever f^6 constitutes the means for actuating not only the wipers, but also the positioning devices through the medium of their actuating-levers *e e* referred to.

Referring now to Figs. 2, 3, 7, and 8, assuming the carriage *a*, carrying the operative parts described, to be in its rearmost position, a last *m*, upon which has been previously arranged a vamp or upper *n* for a boot or shoe, is placed upon the usual supporting-spindle *m'*, the operation of the machine being then as follows, viz: The operator by rotation of the hand-wheel a^5 moves the carriage *a* to the left in the drawings to carry the heel-clasp *d'* toward and to embrace the heel of the last with the vamp thereupon, said clasp operating, as described, to tightly embrace and adapt itself to the form of the heel of the last. The operator now draws the handle f^6 toward him in the direction of the arrow, Fig. 2, causing its pin f^{15} to travel for a short distance in the slot f^{14} of the wiper-actuator f^3 without moving the actuator or its wipers. During the time of this lost motion, however, the roller-stud f^{11} on the link f^{10}, connected with the hand-lever referred to, moves in the angular portions of the slots *e'* in the levers *e* and throws the latter outwardly, thereby acting through the springs e^2 to move the inner or free ends of the positioning devices, which are connected with the heel-clasp, inwardly toward the sides of the last to cause the said clasp to tightly embrace said last. If the heel end of the last should by reason of its being a right or left last of extreme form stand with its median line in a considerable angular position, one end of the heel-clasp connected with one of the positioning devices—for instance, the lower one, (marked 100,) as in Fig. 7—will contact with one side of the last before the other end of the clasp and other positioning device (marked 101) reach the opposite side of the last, so that when one of the positioning devices 100 is thus stopped in its movement by contact with the last the stud f^{11}, following in the slot *e'* of the lever *e* of said positioning device and being unable to move it farther, will follow the path of said slot and thereby act through the slot *e'* of the other lever *e* to move said other lever and its connected positioning device 101 until the latter has been swung inwardly to meet the opposite side of the last, such position being indicated in dotted lines, Fig. 7. Thus it matters not what may be the angle of the median line of the last the positioning device which first strikes the last will be stopped and the other will continue to move until it also brings up against the opposite side of the last, thereby placing said positioning devices and their roller-studs d^9 in the same relative positions to their respective sides of the last and to the median line of the last, and since the positioning devices stop when and only when they meet the last they must position the roller-studs d^9 always the same distance from the sides of the last whatever the width of the latter.

Any movement of the hand-lever after both positioning devices meet the last acts equally upon and to press or clamp both positioning devices tightly against the sides of the last, and after the positioning devices have been tightly pressed against opposite sides of the last should the slots *e'* cause a further movement of their levers *e* such additional movement will be taken up by the springs e^2 without further moving the positioning devices.

The shifting of the positioning devices to adapt themselves to different angles of lasts acts through the roller-studs d^9 to automatically shift the wiper-plates also into positions in alinement with the median line of the last, so that they, as shown in Fig. 8, will move forward and back uniformly at opposite sides of the last.

During movement of the hand-lever to operate the positioning devices for shifting the wipers for rights and lefts, as described, the pin f^{15} reaches the end of the slot f^{14} in the wiper-actuator f^3 at or about the time the roller-stud f^{11} reaches and enters the longitudinal portions of the slots *e'* in the levers *e e*, so that during further movement of the

said hand-lever, when the roller f^{11} traveling in the said longitudinal portions of the slots e' operates no longer to move the levers e, said pins f^{15}, acting against the end of the slot f^{14}, push the actuator f^3 in the direction of its length and toward the last to thereby impart to the wiper-carriers and their wipers a forward movement over the heel end of the last, said wipers as they are moved forward being given an inward or closing movement by the cam-slots f' and roller-studs d^9 on the positioning devices to cause them to wipe or lay the edges of the vamp over and upon the last and the inner sole thereupon.

Since the starting positions of the wiper-carriers are in all cases fixed and determined by the positioning devices, to which they are connected by the roller-studs d^9, and since the positioning devices when clamped against the sides of the last will of necessity assume always the same positions relatively to said last, the wiper-carrier and wiper must also be brought by the positioning devices always into the same positions relatively to the last, whatever be the width of the latter. In other words, the starting positions of the wipers and their carriers when considered with relation to the sides of the last are always the same, and since the wipers are, as has been stated, always moved the same distance from their starting positions—*i. e.*, since they always have, say, three-quarters ($\frac{3}{4}$) of an inch throw, whatever be the starting-point—it follows that starting from the same points outside a last and moving always a certain distance over and upon the last they will always move to a certain predeterminate position on the last.

If, for example, the wipers are given a movement such as will carry them three-eighths ($\frac{3}{8}$) of an inch over and upon a narrow last, since they start the same distance outside of a wide last they will move three-eighths ($\frac{3}{8}$) of an inch over and upon a wide last. Thus in the present embodiment of my invention the positioning devices by varying the starting positions of the wipers necessarily vary the limits of the inward or lasting movements thereof, and by thus varying the lasting movements of the wipers or lasting devices insure in advance—*i. e.*, predeterminately—the positioning of the said devices at the same distance inwardly from the sides of the last, whatever be the width of the latter, and this position or distance is nevertheless predeterminate, whether such position be regarded as the most inward position of the wipers or any intermediate position into which they may be moved or backed during the return movement of the wipers, for into whatever position they may be moved such position will always be the same relatively to the sides of the last for both wipers or lasting devices, and such position in each case is fixed in advance or predetermined by the positioning devices.

In lasting by machines of this type it is considered best in all cases that the wipers be first carried completely over and to conceal the overturned portion of the vamp in order to better lay and flatten the overturned edge upon the inner sole, the wipers being thereafter backed off or withdrawn sufficiently to expose the edge of the overturned vamp in order that the tacks may be driven through said smooth and flattened edge into the inner sole and last to hold the upper in its lasted condition. In my invention as herein embodied, to enable the wipers to be thus backed off or withdrawn without moving the hand-lever f^6 the entire length of the slot f^{14} in the actuator f^3 I have provided a suitable device, shown as a latch h, (see Fig. 2,) pivoted at h' to the actuator f^3 and provided at the outer edge of its free end with a toe h^2 and at an intermediate point at its outer edge with a projecting shoulder h^3. (Shown in dotted lines, Fig. 4.)

The top plate t (see Fig. 4) is provided at its under side and adjacent the latch h with a depending projection h^4, which, as the actuator f^3 is moved forward by the hand-lever, acts upon the inclined face of the toe h^2 of the latch and just before the end of the forward movement throws the said latch inwardly with its lug h^3 behind the pin f^{15} on the hand-lever, which pin during the latter part of the forward movement is in position against the left end of the slot f^{14}, Fig. 2, said latch thus holding the pin f^{15} at the left end of said slot, so that when it is desired to back off the wiper-plates return movement of the hand-lever in a direction opposite the arrow, Fig. 2, will act through the said latch to immediately withdraw the actuator and the wipers to any desired extent. During this return movement of the actuator the latch h is prevented from moving outwardly to its normal position, Fig. 4, to disengage the pin f^{15} by the inner wall of the depending lug h^4 on the top plate referred to, said lug being made of such length as to hold the latch in its position, confining the pin in the slot, as described, for a period of time sufficient to enable the plates to be backed off to the farthest extent needed. When, however, in this return or backing-off movement the toe on the latch clears the depending lug h^4, the pressure of the pin f^{15} on the shoulder h^3 of said latch, which shoulder is preferably made rounded or beveled for the purpose, throws said latch back or outwardly into its normal position, thereby freeing the pin and permitting it to move to the opposite end of the slot f^{14} in the actuator, where it remains in position for further use. The positioning devices D shown in this embodiment of my invention perform two distinct functions—first, the shifting of the wiper-plates into proper angular positions to enable them to move uniformly inward from opposite sides of a last, whether it be a right or a left last, and, second, they determine the movement of said wiper-plates, so that they may be predeterminately posi-

tioned upon the last at the same distance from the outside or contour thereof whatever be the size or width of the last.

In the embodiment of my invention herein shown the positioning devices—that is, the means which determine in advance the subsequent movements of the wipers—are actuated in advance of and during the lost motion which precedes the movement of the hand-lever operating the wipers.

So far as known to me it is new in a lasting-machine to provide an operating member with connections between it and the lasting devices whereby initial movement of the operating member in one direction takes place without corresponding movement of the lasting devices, and initial movement of the operating member in the opposite direction causes corresponding movement of the lasting devices. This is particularly true when positioning means are employed, as hereinbefore disclosed.

It is obvious to those skilled in the art that my invention herein described as embodied in a mechanism for lasting the heel end of a shoe is equally applicable to the lasting devices employed at the toe end of the shoe, or, in fact, my invention as herein set forth may be applied to advantage in connection with any of the lasting devices employed in the machine.

My invention is not limited to the particular embodiment or construction herein shown, for it is evident the same may be varied without departing from the spirit and scope of my invention.

End lasting mechanism substantially identical with that herein shown and described is disclosed in another application filed by me May 24, 1897, Serial No. 637,850, which latter application contains claims which are generic to mechanisms having the capacity for automatic adjustment to meet variations in swing presented by the ends of lasts, whether rights or lefts.

Having described my invention and without limiting myself as to details, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lasting-machine, the combination with lasting devices and actuating means therefor of means acting automatically to cause said lasting devices in their lasting movement to stop always at substantially the same distance inwardly from the sides of the last, whatever be the size or width of the latter, substantially as described.

2. In a lasting-machine, the combination with lasting devices and actuating means therefor, of means to place said lasting devices in starting positions substantially the same distance from the outside of said last, whatever the size or width of the latter, substantially as described.

3. In a lasting-machine, the combination with lasting devices and actuating means therefor, of means coöperating with the last or the material thereupon for automatically placing said lasting devices in starting positions at substantially the same distance from the outside of said last, whatever the size or width of the latter, substantially as described.

4. In a lasting-machine, the combination with lasting devices, and actuating means therefor, of means coöperating with the last or with the material thereupon to vary the inward limit of lasting movement of said lasting devices, substantially as described.

5. In a lasting-machine, the combination with lasting devices and actuating means therefor, of means to predeterminately vary the inward limit of lasting movement of said lasting devices to meet varying sizes or widths of lasts, substantially as described.

6. In a lasting-machine, the combination with lasting devices of automatic limit-varying means for automatically varying the inward limit of lasting movement of said lasting devices to meet varying sizes or widths of lasts, substantially as described.

7. In a lasting-machine, the combination with lasting devices, of means coöperating with the side of the last or the material thereupon for predeterminately varying the inward limit of lasting movement of said lasting devices to meet varying sizes or widths of lasts, substantially as described.

8. In a lasting-machine, the combination with end lasting devices and means to shift the same laterally to meet right and left lasts, of means to predeterminately fix the limit of lasting movement of said lasting devices always at substantially the same distance inwardly from the outside of the last, whatever be the width of the latter, substantially as described.

9. In a lasting-machine, the combination with end lasting devices, means to shift the same laterally to meet right and left lasts and means to vertically adjust said lasting devices to meet the difference in spring of the lasts, of means to predeterminately fix the limit of lasting movement of said lasting devices always at substantially the same distance inwardly from the outside of the last, whatever be the width of the latter, substantially as described.

10. In a lasting-machine, the combination with lasting devices and positioning devices to vary the inward limit of lasting movement of said lasting devices, of means to successively operate said positioning devices and lasting devices, substantially as described.

11. In a lasting-machine, the combination with lasting devices and predeterminate positioning devices therefor, of a single operating member connected with and to successively operate said positioning and lasting devices, substantially as described.

12. In a lasting-machine, the combination with lasting devices and predeterminate positioning devices therefor, of a single operating member connected with and to operate both said positioning and lasting devices, and

furnishing a lost motion between the beginning of movement of the said operating member and the beginning of the movement of said lasting devices during which period said positioning devices are operated, substantially as described.

13. In a lasting-machine, the combination with the swinging wipers and actuating means to open and close the same, of positioning means cooperating with the last to swing the said wipers or either of them into starting position prior to movement of the same by said actuating means, substantially as described.

14. In a lasting-machine, the combination with swinging wipers, means to reciprocate the same and cam-surfaces thereon to open and close said wipers, of positioning means cooperating with said cam-surfaces to change the position of said wipers or either of them in addition to the change in position imparted thereto by said actuating means, substantially as described.

15. In a lasting-machine, the combination with the swinging wipers provided with cam-slots and means to reciprocate the same, of positioning devices cooperating with the sides of the last and provided with studs entering said cam-slots, substantially as described.

16. In a lasting-machine, the combination with the swinging wipers provided with cam-slots and means to reciprocate the same, of positioning devices provided with pins entering said slots, and means to move said positioning devices toward and from the sides of said last, substantially as described.

17. In a lasting-machine, the combination with lasting devices and an operating member therefor, of a positioning device connected with and to be moved by said operating member against the last, and a spring interposed between said operating member and positioning device to enable the latter to be moved after the former contacts with the last or the material thereupon, substantially as described.

18. In a lasting-machine, the combination with the swinging wipers provided with cam-slots, and a handle connected with and to reciprocate said wipers, of fulcrumed positioning devices provided with pins entering said cam-slots and operating-levers connected with said positioning devices, and themselves provided with cam-slots to be operated by said handle, substantially as described.

19. In a lasting-machine the combination with lasting devices and actuating means therefor of means for predeterminately varying the movement of said lasting devices by said actuating means to cause said lasting devices to uniformly operate on lasts of varying width, substantially as described.

20. In a lasting-machine, the combination with lasting devices, of means for actuating the same, said means also acting to automatically vary the lasting movement of said lasting devices according to the width of the particular last used, substantially as described.

21. In a lasting-machine, the combination with end lasting devices made laterally adjustable to meet right and left lasts, vertically adjustable to meet different springs of last, and capable of rocking to adapt the same to the inclination of the last-bottom, of means to predeterminately vary the limit of lasting movement of said lasting devices to meet varying widths or sizes of lasts, substantially as described.

22. In a lasting-machine, the combination with end lasting devices and a clasp, and means to shift the said lasting devices and clasp laterally to meet right and left lasts, of means to predeterminately position said lasting devices at the same distance inwardly from the outside of said last, whatever be the size or width of the latter, substantially as described.

23. In a lasting-machine the combination with lasting devices, a clasp and means to open and close the same; both said lasting devices and clasp having the capacity of lateral shifting or adjustment to meet the varying swings of right or left lasts, of connecting devices between said lasting devices and said clasp whereby lateral shifting of one causes lateral shifting of the other substantially as described.

24. In a lasting-machine, the combination with lasting devices, and a yielding clasp capable of adapting itself to different shapes of lasts at the end thereof, of means to shift said yielding clasp laterally to meet right and left lasts, means to vertically adjust said clasp to meet different springs of lasts and to roll it to meet the angle due to the roll of the last, substantially as described.

25. In a lasting-machine, the combination with lasting devices, of a clasp and positioning devices cooperating therewith to predeterminately position said lasting devices at substantially the same distance inwardly from the outside of said last, whatever the size or width of the latter, substantially as described.

26. In a lasting-machine, the combination with the end lasting devices, of the positioning devices cooperating therewith to predeterminately position said lasting devices at substantially the same distance inwardly from the outside of the last whatever be the size or width of the latter, the chain connected therewith and the clasp arranged on said chain, substantially as described.

27. In a lasting-machine, the combination with end lasting devices, the positioning devices cooperating therewith to predeterminately position said lasting devices at substantially the same distance inwardly from the outside of the last whatever be the size or width of the latter, the chain yieldingly connected therewith and the clasp arranged on said chain, substantially as described.

28. In a lasting-machine, the combination with the swinging wipers, the reciprocating slotted actuator therefor, an operating-lever and a pin moving in said slot and operated by said lever, combined with a latch adapted to hold said lever in position with said pin at one end the slot in said actuator, and means to release said latch, substantially as described.

29. In a lasting-machine, the combination with lasting devices, an operating member therefor, connections between said operating member and lasting devices, whereby initial movement of said operating member in one direction takes place without corresponding movement of said lasting devices, and initial movement of said operating member in an opposite direction causes corresponding movement of said lasting devices.

30. In a lasting-machine, the combination with lasting devices, and positioning means therefor, an operating member, operating connections between the same and said lasting devices and positioning means, said operating connections automatically causing movement of said positioning means prior to lasting movement of said lasting devices on movement of said operating member in one direction, but not in an opposite direction.

31. In a lasting-machine, the combination with lasting devices, and positioning means therefor, of an operating member, means connecting the said operating member with said lasting devices and positioning means, said connecting means causing initial movement of said operating member first to operate said positioning means to position the lasting devices prior to effective lasting movement thereof, said connections thereafter connecting said operating member and lasting devices whereby the latter are made directly responsive to the movements of said operating member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MATTHIAS BROCK.

Witnesses:

FREDERICK L. EMERY,

GEO. W. GREGORY.

No. 701,412. Patented June 3, 1902.

S. SNOW.

LASTING MACHINE.

(Application filed June 25, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

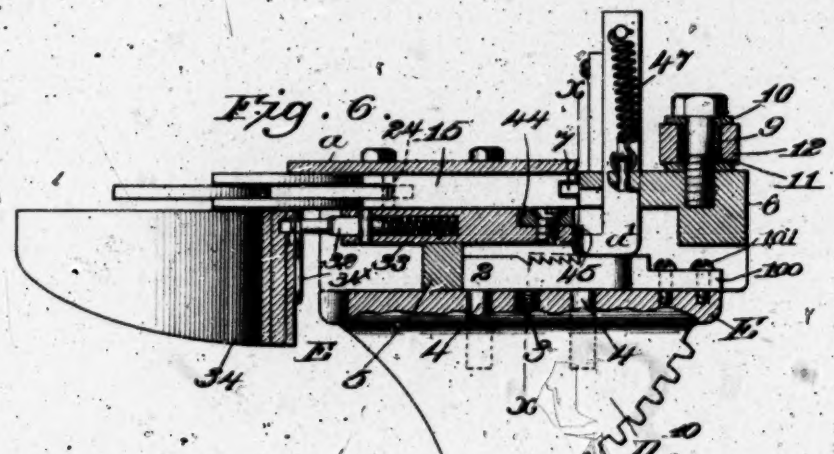


Fig. 8.

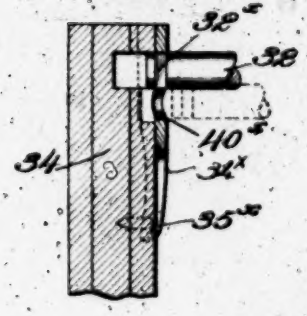


Fig. 9.

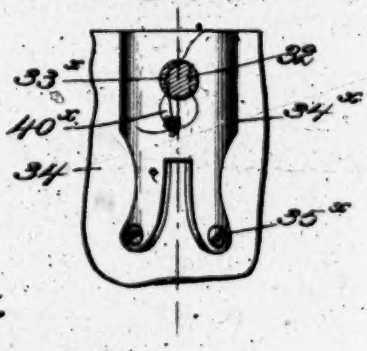


Fig. 7.

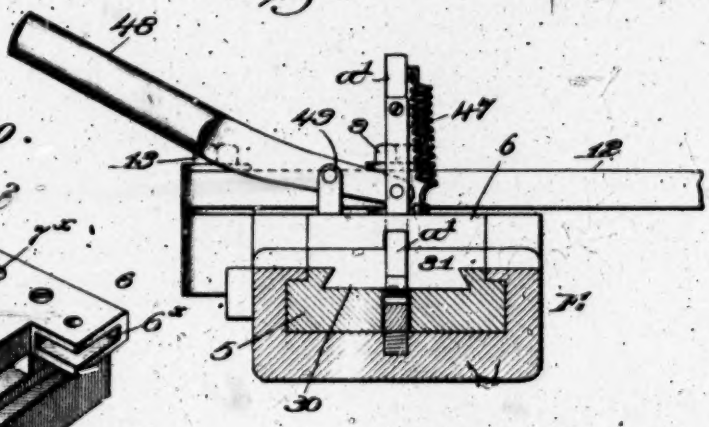
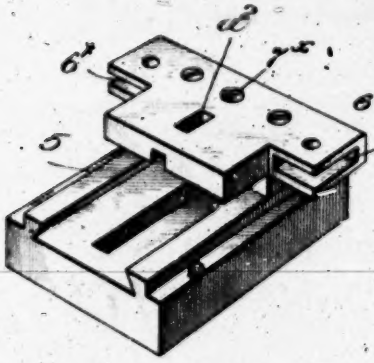


Fig. 10.



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No. 701,412. Patented June 3, 1902.

S. SNOW.

LASTING MACHINE.

(Application filed June 28, 1900.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

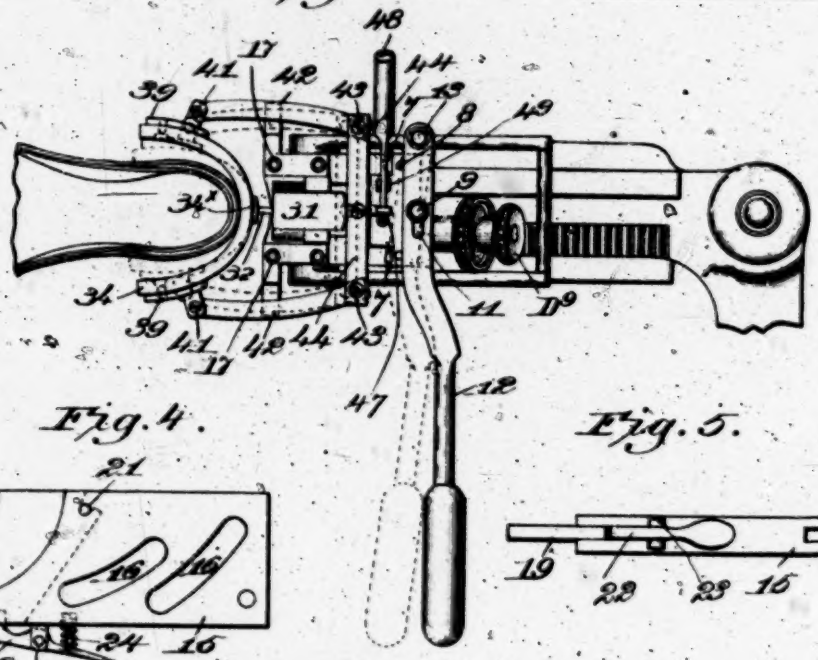
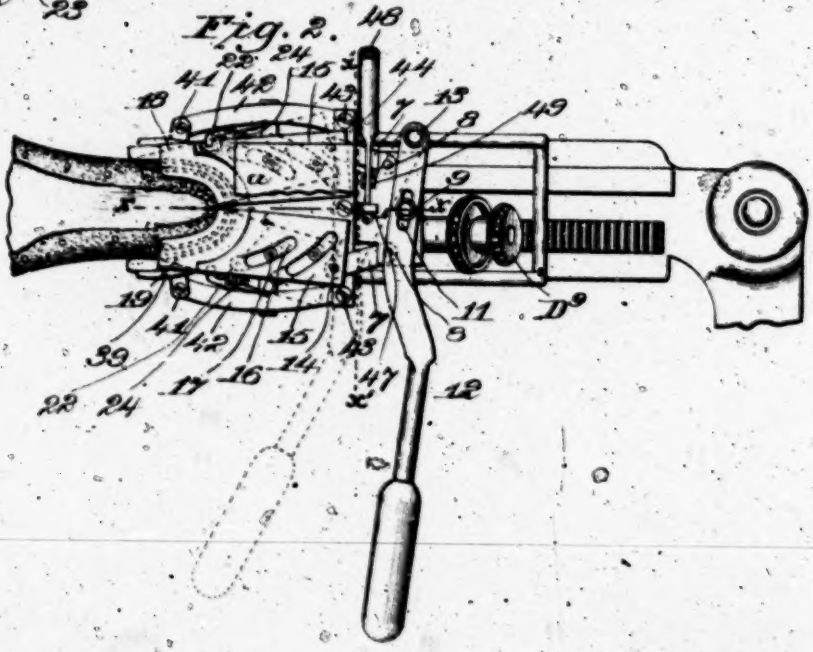


Fig. 4.

Fig. 5.

Fig. 2.



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No. 701,412. Patented June 3, 1902.

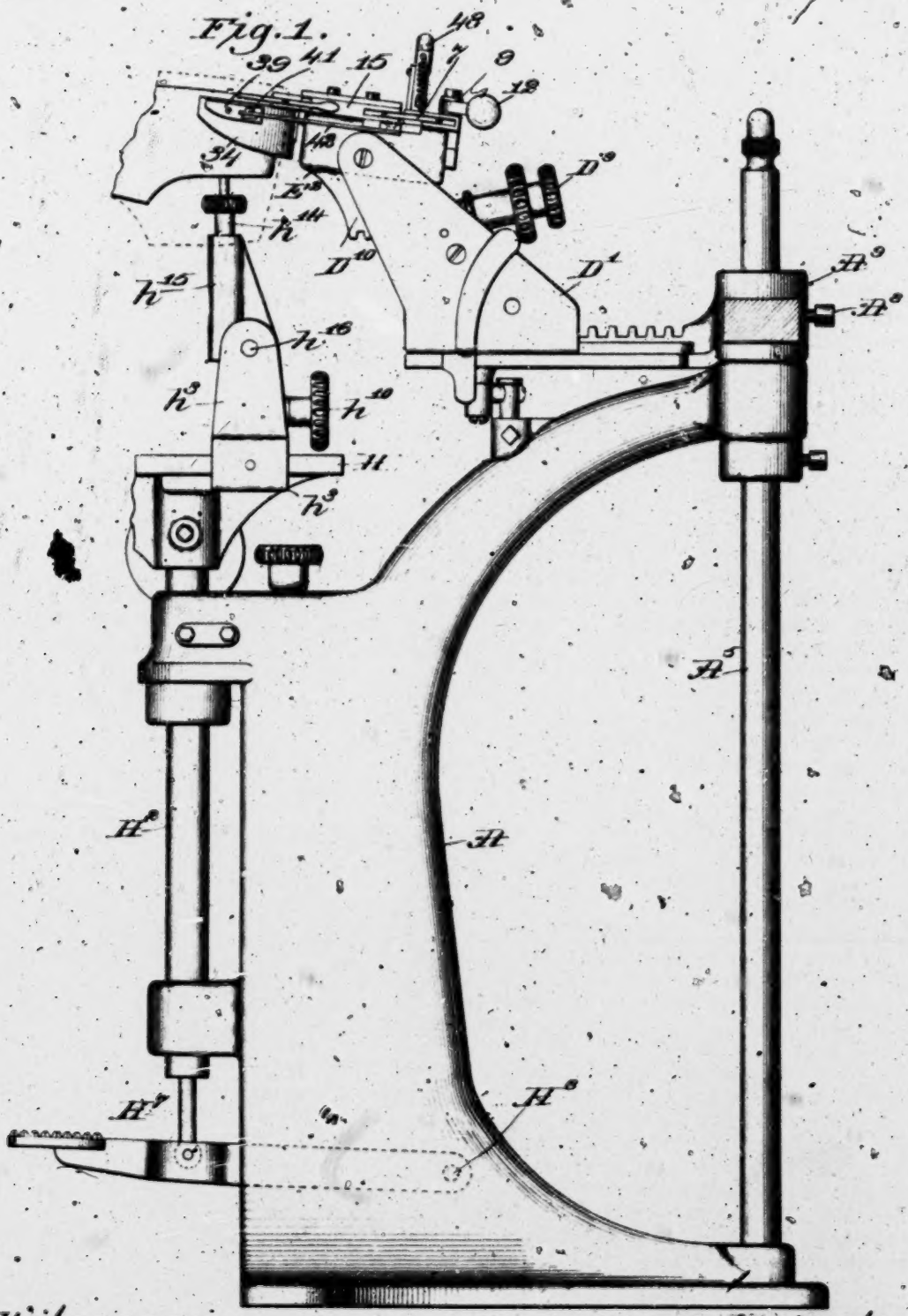
S. SNOW.

LASTING MACHINE.

(Application filed June 25, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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UNITED STATES PATENT OFFICE.

STEPHEN SNOW, OF EVERETT, MASSACHUSETTS, ASSIGNOR TO PEERLESS MACHINERY COMPANY, OF CHARLESTON, WEST VIRGINIA, AND NEW YORK, N. Y.

LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 701,412, dated June 3, 1902.

Application filed June 25, 1900. Serial No. 21,397. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN SNOW, a citizen of the United States, residing at Everett, county of Middlesex, State of Massachusetts, have invented an Improvement in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object to improve the end lasting means in a lasting-machine for boots and shoes.

The invention herein contained is intended as an improvement on the class of lasting-machines represented in United States Patent No. 193,446, dated July 24, 1877. In machines having crimping-jaws made, as described in said patent, to lay the upper over upon the inner sole supported by the last the jaws have to be changed to adapt the machine to right and left lasting. Herein for crimping or laying the upper on the inner sole I employ two sliding plate-carriers provided with crimping-plates detachably secured thereto, and to change from right to left lasting I invert and transpose the said plates—as, for instance, the plate used to meet the upper of a right-foot shoe at the right hand of a line drawn through the last from toe to heel is turned over or inverted when a left-foot shoe is to be lasted and the turned-over plate is transposed, so that it meets the upper at the left-hand side of said line, the other plate of the pair being in a like manner overturned and transposed or changed in position to act on the other side of a left-foot shoe. There is necessarily a difference in the curvature of the concaved acting edges of the two plates used to crimp the upper at the end of the last, and I have found that by inverting and transposing said plates in their carriers right and left foot shoes may be lasted equally well, and this change of position of plates may be easily and quickly made. I have provided the machine with an end clamp composed, preferably, of flexible material, which may be leather, secured at its ends to ears pivoted upon levers in turn pivoted upon an evener-bar pivoted upon an intermediate slide. The tipping guideway has roller or other studs which enter diagonal slots in the plate-carriers, and said carriers are moved forward for crimping and returned into their inoperative position by links connected with a main slide. These slides have coacting with them a coupling, which is effective to insure their movement substantially in unison while the end clamp is being moved into position to embrace the upper at the end of the last, and the clamp having been seated the coupling is disengaged, and thereafter the crimping-plates may be moved forwardly and lay the upper on the inner sole, and this done the crimping-plates are retracted and the clamp is withdrawn from the upper. These two carriages are represented as moved by one and the same hand-lever.

Figure 1 in side elevation represents a sufficient portion of a lasting-machine to enable my invention to be understood. Fig. 2 is a top or plan view of part of the machine represented in Fig. 1 to illustrate particularly my improvements, the parts being shown as in their operative position, part of the cover-plate *a* being broken away. Fig. 3 is a similar view to Fig. 2 with the plate-carriers and crimping-plates removed. Figs. 4 and 5 are respectively plan and edge views of one of the plate-carriers with a plate. Fig. 6 is an enlarged section in the line *x*, Fig. 2. Fig. 7 is a cross-section in the line *x'*, Fig. 2. Fig. 8 is a section through the middle portion of the clamp and its connected locking-plate, it showing part of the clamp-sustainer. Fig. 9 is a view looking at Fig. 8 from the right. Fig. 10 is a detail showing the main slide detached.

In the drawings, A represents a column sustaining a spindle H^3, jointed to a treadle H^7, pivoted at H^8. The spindle has at its upper end a head or track H, upon which in practice is mounted a carriage h^3, having a stud h^{16}, upon which is pivoted a lever-arm h^{15}, carrying a last-holding pin h^{14}, adjustable in said lever-arm. The position of the lever-arm is variable to put the last-holding pin more or less out of a vertical line by means of a worm-screw h^{10}. The column also in suitable bearings sustains a rocking spindle A^5, having connected to it by a set-screw A^8 the hub A^9

of a two-armed carrier, said carrier supporting in practice two carriages D', each carriage having pivotally mounted upon its upper end a guideway E, provided at its lower end with a toothed sector D^{10}, which is engaged by a suitable worm on a shaft having at its end a hand-wheel D^9, the rotation of said shaft tipping the guideway upon the carriage to place the crimping-plates to be described in the proper line of travel to properly coact with the shoe to be lasted.

The parts so far described are substantially those illustrated in application, Serial No. 15,183, filed on the 2d day of May, 1900, and no claim is made to any of said before-named parts, and instead of the particular parts so far described I may employ any other equivalent devices commonly used or found in lasting-machines.

The invention to be herein described relates, among other things, to the end clamp and actuating means and to the peculiarly-constructed toe-crimping plates and their carriers, and while I have illustrated my invention as applied to the heel end of a last it will be understood that it is equally applicable to the lasting of the toe, and especially it will be understood that the provision for inverting and transposing the plates used for crimping or wiping the upper over upon the inner sole is of greater advantage in toe than in heel lasting.

In accordance with my invention I provide the guideway E with a toothed block 2, forming part of a coupling, it being sustained yieldingly upon a spring 3 and being guided vertically in its movements by suitable dowel-pins 4, represented as entering holes in the guideway. The guideway receives in it a main slide 5, (shown detached in Fig. 10,) said slide being open at its center and provided at its rear end with an upwardly-extended portion 6, suitably slotted at $6^{\times}$ to receive the ends of like links 7, which surround pins 8 in said ears. The central portion of the part 6 has a threaded hole $7^{\times}$ to receive a stud 9, provided, preferably, with a roller 10, which in practice enters a slot 11 in a hand-lever 12, pivotally mounted upon a stud-screw 13, fixed to the guideway E. The forward ends of the links 7 are connected by pins 14 with the crimping-plate carriers 15, each having, as represented, a plurality of curved slots 16, which receive roller or other studs 17, erected on the guideway E, said carriers when slid horizontally under the cover-plate a, by the movement of the lever 12, moving in a diagonal line and causing the crimping-plates 18 19, connected with the crimping-plate carriers, to move over the ends of the last in such a direction that the concaved edges 20 of said plates act upon the upper to lay the same on the inner sole by an inward movement, which causes the upper to be laid snugly against the edge of the last whatever the conformation of the end thereof on which the inner sole rests. The crimping-plates 18 19, one of which is shown on a larger scale in Fig. 4, present each an acting edge 20. These plates have each notches, one of which engages a stud 21, while the other notch is engaged by a locking device 22, represented for convenience as a lever pivoted at 23 and acted upon by a spring 24, the plate being consequently connected detachably with said carrier, said locking device holding the plate in working position. The acting edges 20 of these plates differ in curvature, and this curvature varies according to the particular shoe to be lasted—that is, different styles of shoes require different styles of lasts and the edge 20 must be correspondingly shaped. These plates in practice are or may be lettered on one side by the letter "R" (see Fig. 4) to represent when the plates are put in with "R" uppermost that they are adapted to last a right-foot shoe and when inverted they are adapted to last a left-foot shoe. I have demonstrated by experiment that plates shaped to properly last a right shoe may be made to last a left-foot shoe, provided the plates are inverted and transposed—that is, suppose the plates were in position with the letter "R" uppermost. Now to last a left-foot shoe it is only necessary to engage the locking device, turn it to release the plates, remove the plates, and take, say, for instance, the plate used to contact with the part of the last at the right-hand side of a line drawn through the last from toe to heel, invert it and put it into the opposite carrier, so that that plate in its transposed and inverted position will act upon a part of the upper at the opposite side of the line drawn from the heel to the toe of the last from that it acted upon when it was used for right-shoe lasting. It will of course be understood that where there is no particular variation in the shape of the last at the inner side of the toe of right and left foot lasts then the plates may be used without change for right and left foot lasting.

The main slide 5 is provided (see Fig. 7) with a dovetailed way to receive, as represented herein, a dovetailed foot 30 of an intermediate slide 31, represented as bored at its upper end next the last-holding pin to receive loosely the shank of a clamp-sustainer 32, made other than round, which enters said bore, the rear end of the clamp-sustainer being acted upon by a spring 33, contained in said bore. The front end of the sustainer 32 is shown as notched at opposite sides, as at $32^{\times}$, said notches being entered by the edges $33^{\times}$ (see dotted lines, Fig. 9) of a plate $34^{\times}$, connected by screws $35^{\times}$ with the middle portion of the end clamp 34, the latter being flexible and composed, preferably, of a plurality of layers of leather. Connecting the sustainer 32 with the clamp detachably enables the clamp if injured or worn to be removed quickly from the machine and another one to be substituted without taking the machine to pieces. The plate $34^{\times}$ has a peculiar-shaped slot—that is, it has a round end or eye $40^{\times}$, out

from one side of which is extended a slot. The round eye receives the end of the sustainer 32, and the engagement of the plate with the sustainer is effected by depressing the plate, causing the sustainer to enter the slot leading from said eye. The ends of the clamp 37 have applied to their outer side ears 39, which are connected with the clamp by suitable screws or rivets. The ears 39 receive stud-screws 41, which are embraced by like links 42, jointed at 43 to an evener 44, pivotally connected with the intermediate slide, so that as said slide is moved the clamp is also moved, the evener permitting the ends of the clamp to be self-adjusting to any variations in shape of the sides of the last. The sustainer made other than round prevents any twisting or rocking movement of the clamp at the point where it is sustained loosely in the intermediate slide. The intermediate slide has suitably fixed to it at its outer or rear ends (see Fig. 6) a tooth 45, which is engaged by the teeth of the block 2, the latter being permitted to rise under the action of spring 3 after the intermediate slide 31 has been moved forward to put the clamp into its operative position. The intermediate slide 31 is moved forwardly by the action against its rear end of a coupling a', to be described, acted upon by the part 6 of the main slide 5, said coupling being at such time interposed between said main and the intermediate slides, causing the two slides to be moved in unison until the clamp embraces firmly the last and the upper thereon, the coupling acting to depress the block 2.

In operation let it be supposed that a last has an upper thereon and that the inner sole is laid upon the tread of the last and that the last has been put in position on the last-holding pin h^{11}. In this condition the clamp occupies the position Fig. 3, and the crimping-jaws occupy their inoperative position, with the edges 20 of the plates outside of and not in contact with the upper, and in this condition the lever 12 will occupy its full-line position, Fig. 3. Turning the lever from its full-line position, Fig. 3, into its dotted-line position will start forwardly toward the last both the main and the intermediate slides, the two slides moving substantially at the same speed until the clamp is seated firmly against the upper at the end of the last. As the clamp becomes seated it is thereafter necessary to move the carriers and their plates forward to turn the upper over the inner sole, while the clamp remains substantially at rest, holding the upper firmly, and to do this the main slide must be free to be moved without moving the intermediate slide, and to do this the coupling a', heretofore referred to, must be raised or moved to uncouple the slides. The coupling a' in the form in which I have chosen to represent it in Figs. 6 and 7 is a bar the shank of which is free to slide vertically in a hole a^2 in a portion of the upward extension 6 of the main slide 5. This bar is normally depressed in its operative position, as shown in Fig. 6, by a contractile spring 47, one end of which is fixed with relation to the main slide, the other end being fixed to a projection extending from the shank of said coupling. The spring 47 is strong enough to depress the block 2 while the two slides are being moved forward in unison. The coupling, however, may be lifted when desired through the hand-operated lever 48, pivoted at 49. When the lever 12 is being moved from its full into its dotted line position, Fig. 3, the coupling occupies the position Fig. 6, and consequently the end of the coupling acting against the rear end of the intermediate slide 31 moves that slide forward in unison with the main slide and with the carriers having the crimping-plates. When the clamp has been seated, as described, the operator will through the hand-lever 48 lift the coupling to put it in its inoperative position with relation to the intermediate slide, the lifting of said coupling enabling the block 2 to rise and engage by one of its teeth the tooth 45, and he will then pull the lever 12 into the dotted-line position, Fig. 2, and during this movement of said lever the coupling rides over the top of the intermediate slide and only the plate-carriers and the crimping-plates are moved forwardly into the full-line position, Fig. 2, which completes the lasting of the upper clamped about the end of the last.

This invention is not limited to a coupling of the particular form shown when used in connection with the other parts of the machine, for as I believe that I am the first to provide a machine employing a main slide adapted to operate crimping-plates and an intermediate slide having a clamp mounted thereon with a coupling to connect the two slides, the said coupling occupying its operative position when the two slides are moved to seat the clamp upon the upper, and to provide means to thereafter move said coupling into its inoperative position or release it from the main slide, so that the crimping-plates may be further moved to lay the upper over the inner sole on the last, I desire to claim the same broadly without being limited in any way except as in the appended claims.

The crimping of the upper over upon the inner sole and the tacking of the overlaid edge of the upper to the inner sole completes the end lasting, and thereafter the lever 12 is moved from its dotted-line position, Fig. 2, into its full-line position, Fig. 3, and during the first part of this movement the plates are removed off the overlaid upper, and the clamp is then retracted, leaving the parts in their normal position ready to again go through the operation hereinbefore described. As the lever 12 is moved backwardly the coupling when it arrives in position to drop from the end of the intermediate slide is depressed by the spring 47, causing it to meet the toothed block 2 and depress it, compressing the spring 3, and releasing the teeth of

the block from the tooth 48, thus permitting the intermediate slide to be moved backwardly with the main slide, the spring 33 aiding in this return.

By the term "coupling" as herein employed I mean to include any device which may be interposed between or made to cooperate with the main and intermediate slides to cause them to be moved in unison, the coupling during this movement occupying what I shall designate as its "normal" or "operative" position, said coupling being capable of being moved into inoperative position whenever the clamp has been seated on an upper on the last, the plate-carriers and crimping-plates thereafter completing their movement, the crimping-plates coming into their operative position. This coupling also, as herein shown, performs another function—that is, it acts to depress the toothed block 2 against its spring 3 while the coupling occupies its normal or operative position and whenever the intermediate slide is to be released to enable it to be moved into its inoperative position.

I have provided the guideway E with a stop 100, connected therewith by suitable screws 101, and said stop forms an abutment for the end of the block 2, thereby relieving the studs 4 from strain.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lasting-machine, a pair of plate-carriers, two crimping-plates one for each carrier, said crimping-plates varying one from the other in the curvature of their acting edges, and means for connecting said plates detachably with said carriers that they may be disengaged from one carrier, overturned, and transposed to the other carrier to enable right and left foot shoes to be lasted.

2. In a lasting-machine, a pair of plate-carriers, combined with crimping-plates detachably mounted in said carriers and having each a concaved edge, said crimping-plates differing one from the other in the contour of their acting edges, each plate being capable of being detached, transposed to the other carrier, and inverted to provide for right or left shoe lasting.

3. In a lasting-machine, a plate-carrier slotted at one end, a plate concaved at one edge and notched and inserted in the slot of the plate-carrier, said notch engaging a projection of said carrier, and means acting upon said plate to lock it in the carrier.

4. In a lasting-machine, a plate-carrier slotted at one end, a plate concaved at one edge and notched and inserted in the slot of the plate-carrier, said notch engaging a projection of said carrier, combined with a spring-controlled latch to engage and effect the retention of the plate in the carrier.

5. In a lasting-machine, crimping-plate carriers, attached crimping-plates, a main slide, a lever, and connections between said slide and said carriers to move the same; an intermediate slide, a clamp mounted thereon, a coupling adapted to be interposed between said two slides, it occupying its operative position when the two slides are moved to seat the clamp upon the upper, and means to thereafter move said coupling into its inoperative position to release it from said main slide that the plate-carriers and their crimping-plates may be further moved to lay the upper over the inner sole on the last.

6. In a lasting-machine, crimping-plate carriers, attached crimping-plates, a main slide, a lever, and connections between said slide and said carriers to move the same; an intermediate slide, a clamp mounted thereon, a coupling adapted to be interposed between said two slides, it occupying its operative position when the two slides are moved to seat the clamp upon the upper, means to thereafter move said coupling in its inoperative position that the plate-carriers and their crimping-plates may be moved to lay the upper over the inner sole on the last, and a device under the control of said coupling to lock said intermediate slide in position, to maintain the clamp against the upper on the last holding the plate-carriers from lasting movement.

7. In a lasting-machine, a slide, a connected clamp, a spring-pressed notched block over which said slide is movable, a tooth on said slide to engage a notch of said block; and means to move said block that it may engage the tooth of the slide, or be made to retire from said tooth as and for the purposes set forth.

8. In a lasting-machine, a flexible clamp to embrace the end of the last, means to sustain the ends of the clamp, and clamp-sustaining means intermediate the ends of said clamp and independent of the means for sustaining the ends of the clamp, said clamp being connected detachably with said intermediate clamp-sustaining means.

9. In a lasting-machine, a flexible clamp having attached to it between its ends a slotted plate, combined with a sliding clamp-sustaining device having slots engaged loosely with said plate to sustain the central portion of the clamp detachably.

10. In a lasting-machine, crimping-plates, carriers for said plates, a slide operatively connected with said carriers, an intermediate slide, a clamp to embrace the end of the last, an evener mounted on said intermediate slide, links connected at one end with said evener and at their other ends with said clamp, means to move the slide connected with said carriers, a coupling to couple the said slides together that they may be moved together until said clamp embraces the upper on the end of the last, and means to then move the coupling to release the slide carrying the clamp while the slide moving the crimping-plates is further moved to meet the upper and lay it over upon the inner sole on the bottom

of the last, and means to lock the clamp in its clamping position while the crimping-plates complete their operative movement.

11. In a lasting-machine, crimping-plates, carriers for said plates, a slide operatively connected with said carriers, an intermediate slide, a clamp to embrace the end of the last, an evener mounted on said intermediate slide, links connected at one end with said evener and at their other ends with said clamp, means to move the slide connected with said carriers, a coupling to couple the said slides together that they may be moved together until said clamp embraces the upper on the end of the last, and means to then move the coupling to release the slide carrying the clamp while the slide moving the crimping-plates is further moved to meet the upper and lay it over upon the inner sole on the bottom of the last, and means to lock the clamp in its clamping position while the crimping-plates complete their operative movement, and means to depress the locking device to unlock the slide for moving the clamp, that it may be moved backwardly after the completion of the action of the crimping-plates.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

STEPHEN SNOW.

Witnesses:
MARGARET A. DUNN,
MABEL PARTELOW.

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S. SNOW.

LASTING MACHINE.

APPLICATION FILED SEPT. 5, 1905.

946,708. Patented Jan. 18, 1910.

2 SHEETS—SHEET 1.

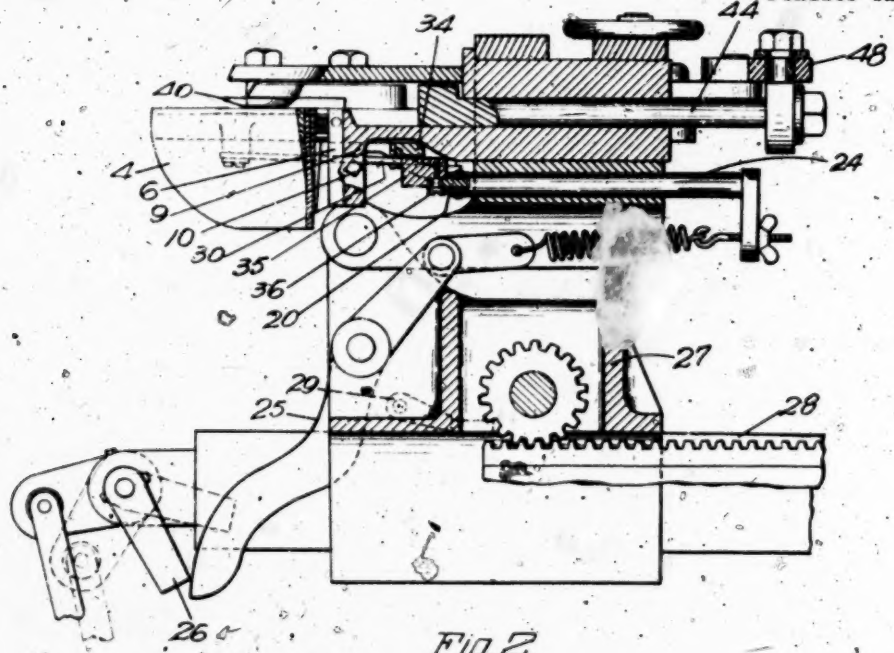


Fig. 2.

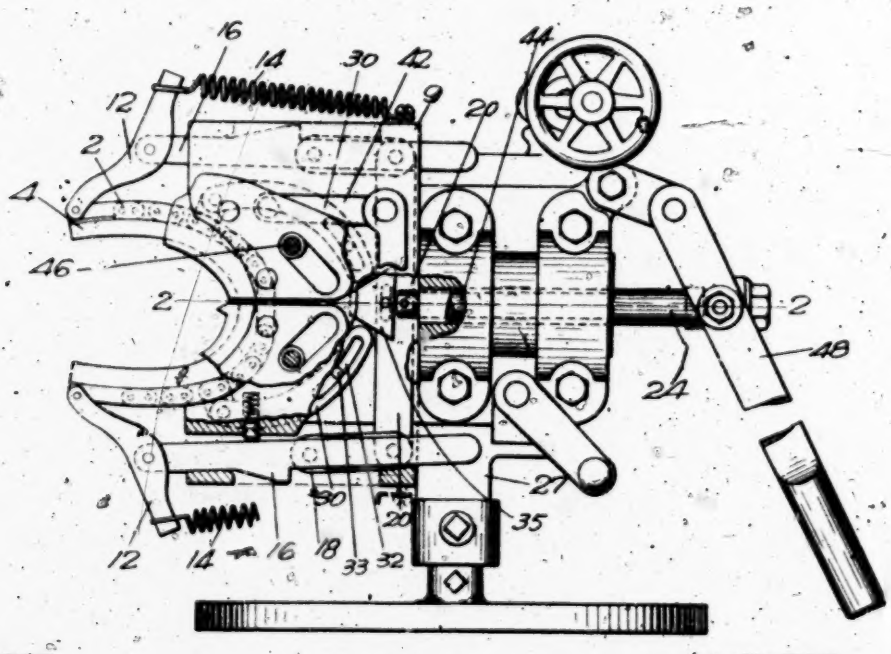


Fig. 1.

WITNESSES.

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174

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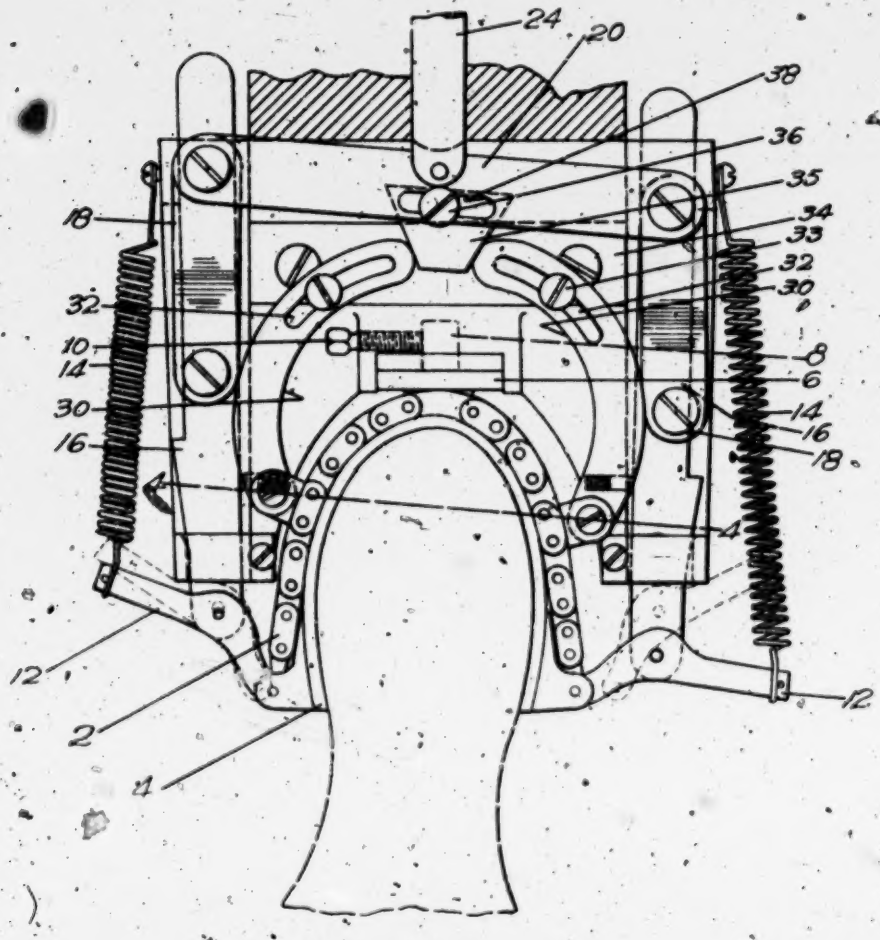
LASTING MACHINE.

APPLICATION FILED SEPT. 5, 1905.

946,708. Patented Jan. 18, 1910.

2 SHEETS—SHEET 2.

Fig. 3.



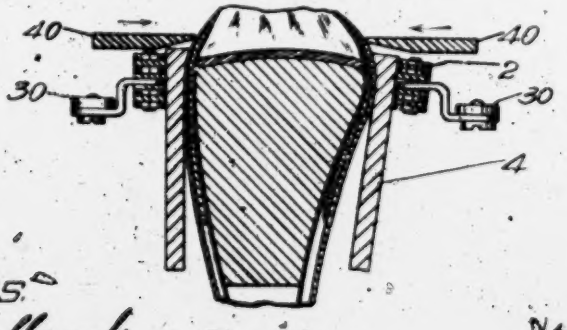


Fig. 4

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UNITED STATES PATENT OFFICE.

STEPHEN SNOW, OF EVERETT, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

LASTING-MACHINE.

946,708. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed September 5, 1905. Serial No. 276,995.

REISSUED

To all whom it may concern:

Be it known that I, STEPHEN SNOW, a citizen of the United States, residing at Everett, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain Improvements in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to means for holding shoe uppers upon lasts and particularly to means for clamping upper materials in position about an end portion of a last during the operation of lasting and holding them while the edge portions of the materials are being manipulated over the edge of the last.

The object of the invention is to secure more perfect fitting of the upper materials to the last than has heretofore been obtained, particularly in certain classes of work in which the upper materials include one or more layers of stiff material which it is difficult to bend or fold over the edge of the last, such as an unmolded counter.

The invention is herein shown as embodied in a lasting machine of the "bed" type, the particular machine herein illustrated as equipped with the invention being known commercially as the Ideal Lasting Machine which is more fully shown and described in United States Letters Patent, No. 521,954 of June 26, 1894, and No. 552,834 of January 7, 1896. In this machine the shoe is held between end-lasting mechanisms by which the upper materials at the two ends of the shoe are manipulated over the edge of a last into position to be secured to the inner sole.

The invention is herein shown in combination with mechanism for manipulating the upper materials into lasted position, but it will be understood that my invention is not limited to use in a lasting machine.

The invention may be embodied in mechanism for holding a shoe for any purpose, as, for example, while it is being lasted either by hand or by a lasting mechanism which is independent of the shoe holding mechanism.

The invention is here shown in combination with mechanism for lasting the heel end of a shoe and it is of particular importance in holding the upper materials of this portion of the shoe, which includes, of course, the heel stiffener or counter, closely against the heel portion of the last, because it is found in practice that these upper materials tend to spring away from the side of the last adjacent to its edge when their edge portions are bent or folded over the edge of the last. This is especially noticeable when counters are used which have straight or unmolded flange portions instead of flange portions which have been molded to lie upon the last bottom.

As machines of the type illustrated have been heretofore constructed, end-embracing bands which are designed to clamp the upper materials about the end portions of lasts have been supported at their two ends and at their middle portions, which engage the extreme rear end of the last and in closing a band it has been firmly pressed against the sides of the last at these three points. With clamping or holding means thus constructed it has been found that during the operation of bending the edge portion of the upper materials over upon the last bottom, and particularly in breaking down the flange of an unmolded heel counter, the upper materials at the corners of the last frequently sprang away from the sides of the last near its edges, the term "corners" being used herein to designate those portions of each side of the last which are located approximately midway between the extreme rear end of the heel and the front ends of the heel stiffener or between the points engaged by those portions of the heel band at which the heel band is supported. This has caused imperfect fitting of the upper at these points which of course was objectionable.

In accordance with the present invention means is provided for holding the upper materials against the last at the corners of the last.

In the illustrated embodiment of the invention pressers are provided by which portions of the band at the sides of the last are caused to force and hold the upper materials against the corners of the last and said pressers are arranged to be actuated or controlled by connections of their own with the actuating mechanism by which the band

is closed. To this end the pressers are separately actuated rather than partaking merely of the movement of the heel band.

As is well known, some lasts are not symmetrically formed at the heel end, but are fuller or larger upon one side than upon the other side. Difficulty has been experienced in clamping the upper materials with the desired firmness against the smaller side of such lasts. To obviate this difficulty one object of the present invention is to provide means for permitting the presser bars to adapt themselves to the contour of the last on its two sides and for then pressing the bars uniformly toward the last so that the upper materials are held firmly against the opposite corners of the last notwithstanding differences in the fullness of the two sides of the last. To this end, in the illustrated embodiment of the invention, the pressers are actuated through an equalizing device which allows either presser first meeting resistance to pause in its movement while the other presser continues to advance until it has encountered an equal resistance on its side of the last, after which the pressers will act uniformly for pressing and holding the upper materials against the last at the two points of engagement.

Other features of the invention including details of construction and combinations of parts will be hereinafter described and pointed out in the claims.

In the drawings which represent a preferred embodiment of the invention, Figure 1 is a plan view of so much of an end-lasting mechanism with my improvements applied to it as is necessary for disclosing the relation of the new parts to the associated portions of the heel clamping and lasting means; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a bottom plan view of the heel clamping band and its actuating mechanism; Fig. 4 is a sectional view on line 4—4 of Fig. 3 showing a shoe in position within the heel band and representing the lasting plates as advancing to break down or fold the upper materials, including an unmolded heel counter, into position to be secured to the inner sole on the bottom of the last.

The heel band for embracing the heel end of the last and clamping and holding the upper materials against the last while the edge portions of said materials are being folded or manipulated into lasted position upon the last bottom is shown as comprising a chain 2 and a leather lining 4 secured to the chain. The chain is provided at the middle rear portion of the band with a depending block 6 having a lateral stud 8 which is received in a recess in the band-support 9 and secured by a screw 10, as shown in Figs. 2 and 3. The front ends of the chain at the open end of the band are pivoted to levers 12, the outer ends of which are connected by springs 14 to the support 9. The levers are pivoted to slide-bars 16 which are guided in the support and are connected by links 18 to the opposite ends of a lever 20. The lever 20 is pivoted midway between its ends to a rod 24, as shown most clearly in Figs. 2 and 3. The rod is longitudinally movable through a guideway in the frame-work of the heel-lasting mechanism and is yieldingly connected with a lever 25 having its lower end in the path of a rocker arm 26 which may be moved manually or by power toward the dotted line position shown in Fig. 2. Movement of the rocker arm in the direction suggested turns the lever 25 to advance the rod 24, for causing the band to embrace the heel end of a shoe and clamp the upper materials against the last. It may be explained that in practice a shoe is supported at the proper altitude to be acted upon and as herein shown the entire end-lasting mechanism supported on the carriage 27 is advanced over the track 28 to position the middle rear portion of the band against the heel end of the last where it is locked by a pawl 29 engaging ratchet teeth on the track. The parts as thus far described may be substantially as shown in Letters Patent, No. 552,834, before mentioned, and it will be understood that by means of the described construction the band is firmly engaged with the extreme heel end of the last and that the actuation of the lever 25 advances the slide-bars 16 which tend to advance the levers 12. This causes the levers first to draw the end portions of the band forwardly until the band has snugly embraced the rear portion of the last, after which the levers rock from the angular position shown in dotted lines in Fig. 3 toward the position shown in full lines for carrying the end portions of the band inwardly against the shoe at about the front ends of the heel stiffener. By this arrangement the upper materials are held firmly against the extreme rear end of the last and against the sides of the last at the front ends of the band, but there is not sufficient pressure against the upper materials at the corners of the last to prevent said materials from sometimes springing away from the last to an objectionable extent while the flange of an unmolded heel stiffener is being broken down.

In accordance with this present invention pressers, herein represented as bars 30, are arranged to act against the shoe at the corners of the last for pressing and holding the upper materials against this portion of the last. As herein shown the bars 30 are connected with the chain 2 and act through the heel band for exerting pressure against the upper materials at the corners of the last. To this end the bars are curved as

shown in Fig. 3 and are provided with curved slots 32 in which stand pins 33 rigidly secured to a cross-plate 34 attached to the band-support 9. The rear ends of the bars are engaged by the inclined faces of a wedge block 35 which is mounted on the lever 20, heretofore described. This arrangement provides that when the lever 25, also before mentioned, is turned for closing the band about the end of the last, the wedge block will be advanced between the rear ends of the bars 30 thus actuating the pressers separately from or in addition to the movement which the band as a whole receives. The arrangement by which the front ends of the bars 30 are connected with the heel band and the walls of the curved slots engage the fixed studs 33 insures that the bars shall rock and advance in curved paths and press against the shoe at the corners of the last, whereby the upper materials are pressed inwardly and securely held against springing away from the corners of the last.

Preferably and as herein shown the wedge block 35 acts as an equalizer for insuring uniform pressure by the two bars 30, and to this end the block is shown as movably mounted upon the lever 20 being connected thereto by a pin 36 passing through a slot 38 in the lever as shown most clearly in Fig. 3. This construction permits either bar that may encounter greater resistance to its advance movement than the other bar to pause while the block moves sidewise upon the lever 20 until the advancing bar encounters an equal resistance, whereupon the two bars will act uniformly against the work. This provision enables the upper to be pressed and held with equal force against the opposite corners of a last which is fuller upon one side than upon the other side.

The means herein shown for breaking down and otherwise manipulating the edge portions of the upper materials into lasting position comprises lasting plates 40 connected by links 42 with the cross-head of a plunger 44 and guided by roller studs 46 to close toward each other as they are advanced by the plunger. A hand lever 48 is shown for actuating the plunger. The advancing and closing movement of the lasting plates causes them to bend or fold inwardly the edge portions of the upper materials, as indicated in Fig. 4, and to press them into lasted position upon the bottom of the last.

In the use of the machine herein shown as provided with my invention, a shoe is positioned upon a jack, not shown, and the heel-lasting mechanism is moved over the track 28 into operative relation to the heel end of the shoe, the middle portion of the band being pressed against the extreme rear end of the heel. The end-lasting mechanism is locked in this position by the pawl 29. The rocker arm 26 is then actuated either manually or by power to turn the lever 25 as described for moving the lever 20 forwardly. This movement of the lever advances the bars 16 for actuating the levers 12 and causes them to tend to draw the ends of the band forwardly and at the same time to press them inwardly, whereby the band is made to embrace the last snugly and to press the upper materials against the sides of the last. The movement of the lever 20 also acts through the wedge-block 35 to press and hold the band against the corners of the last and thereby prevent the upper materials from springing away from the last during the subsequent operation of the wiper-plates 40, by means of the hand lever 48, in breaking down the upper materials and wiping them over the last bottom. If the last is fuller on one side than on the other side, as is the last illustrated in Fig. 4, the wedge-block slides on the lever 20 to cause the presser bar 30 which is located at the side of the last having the less fullness to move farther than the other presser bar whereby the heel band is forced equally against the two corners of the last.

It is obvious that my invention is not limited to the embodiment thereof herein shown but the invention may be embodied in many mechanisms for supporting and holding upper materials about a last.

Having explained the nature of my invention and having fully described a construction embodying the same, I claim as new and desire to secure by Letters Patent of the United States:—

1. In a machine of the class described, the combination with means for clamping upper materials about the end portion of a last, of additional means for holding the upper materials against the corners of the last.

2. In a machine of the class described, the combination with an end-embracing band and mechanism for closing said band about the end of a last, of additional means for pressing said band against the corners of the last.

3. In a machine of the class described, the combination with an end-embracing band and mechanism for closing the band about an end of a last, of means for pressing the band against the opposite corners of the end of the last, and means for equalizing the pressure at the two corners.

4. In a machine of the class described, the combination with a heel band and actuating mechanism for causing the band to embrace the heel end of a last, of means intermediate said actuating means and the portions of the band adjacent to the corners of the last for forcing said portions of the band against the corners of the last.

5. In a machine of the class described, the

combination with means comprising an end-embracing band for clamping upper materials about the end portion of a last, of presser bars engaging the portions of the band adjacent to the corners of the last, a wedge-block for actuating said presser bars, means for supporting said wedge-block, and a movable connection between the wedge-block and the supporting means arranged to cause the block to act equally upon the two presser bars.

6. In a lasting machine, the combination with end-embracing mechanism comprising an end-embracing band, and mechanism for manipulating the upper materials into lasted position upon the bottom of the last, of means for applying pressure through the band to the corners of the last to prevent the upper materials from springing away from the sides of the last while being manipulated into lasted position on the bottom of the last.

7. In a lasting machine, the combination with an end-embracing band and means for closing the band about the heel end of a last, of lasting plates for bending the upper materials over the edge of the last, and means additional to the band closing means for forcing the band against the upper materials at the corners of the last to prevent the upper materials from springing away from the last while being bent over the edge of the last by the plates.

8. In a machine of the class described, the combination with an end-embracing band and actuating mechanism connected with the band at its two ends and at its middle portion, of means for engaging it at places intermediate said points of connection with said actuating mechanism for causing it to hold the upper materials against the corners of the last.

9. In a machine of the class described, the combination with means for clamping the upper materials about the end portion of a last, of additional means arranged for self adjustment to lasts of different shapes for applying pressure through the clamping means for holding the upper materials against the corners of the last.

10. In a machine of the class described, the combination with an end-embracing band, of automatically operating mechanism for closing the band about the end of a last, said mechanism having provision for pressing the band against the corners of the last for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

STEPHEN SNOW.

Witnesses:
JOSEPH WARREN,
C. E. SNOW.

180

T. G. PLANT.

LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

958,280.

Patented May 17, 1910.

14 SHEETS—SHEET 1.

Fig. 1.

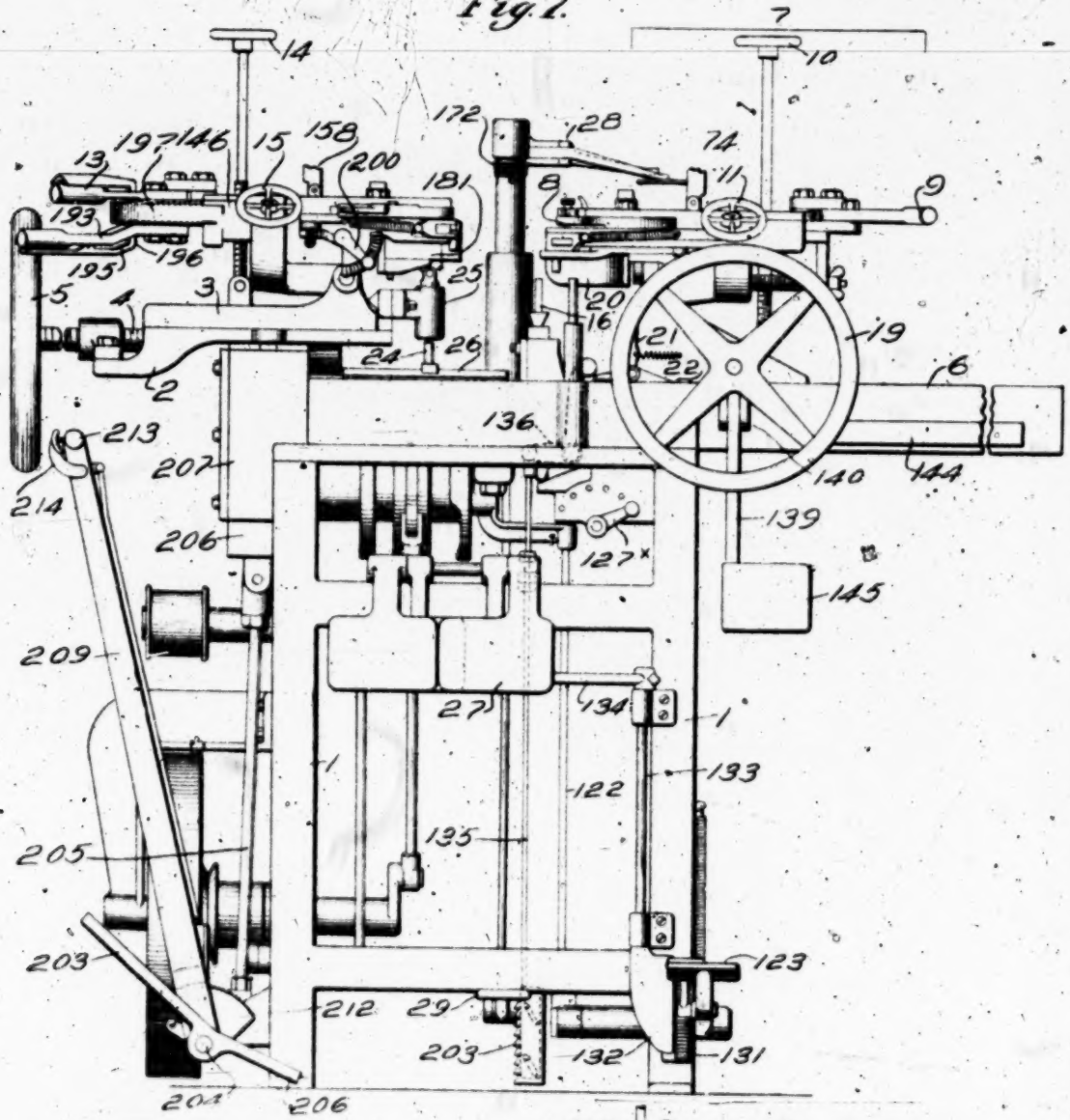
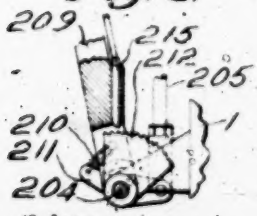


Fig. 3.



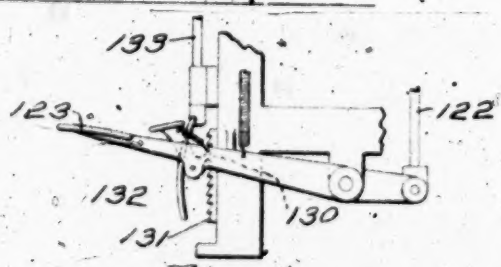


Fig. 2.

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Atty.

182

T. G. PLANT.

LASTING MACHINE.

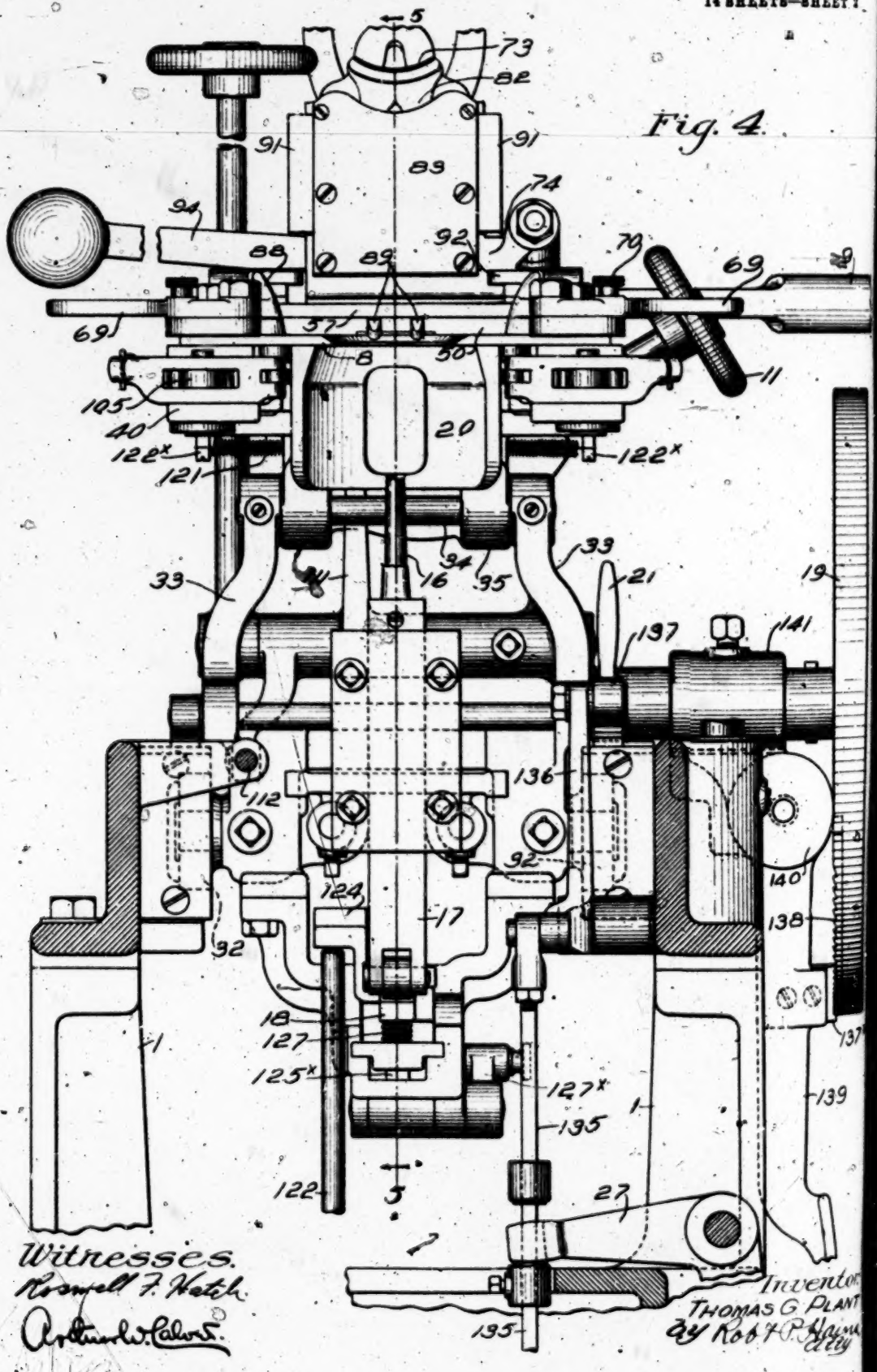
APPLICATION FILED SEPT. 28, 1908.

958,280.

Patented May 17, 1910.

14 SHEETS—SHEET 1.

Fig. 4.



Witnesses.

Roswell F. Hatch.

Arthur W. Calvert.

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By Robt. P. Hayward

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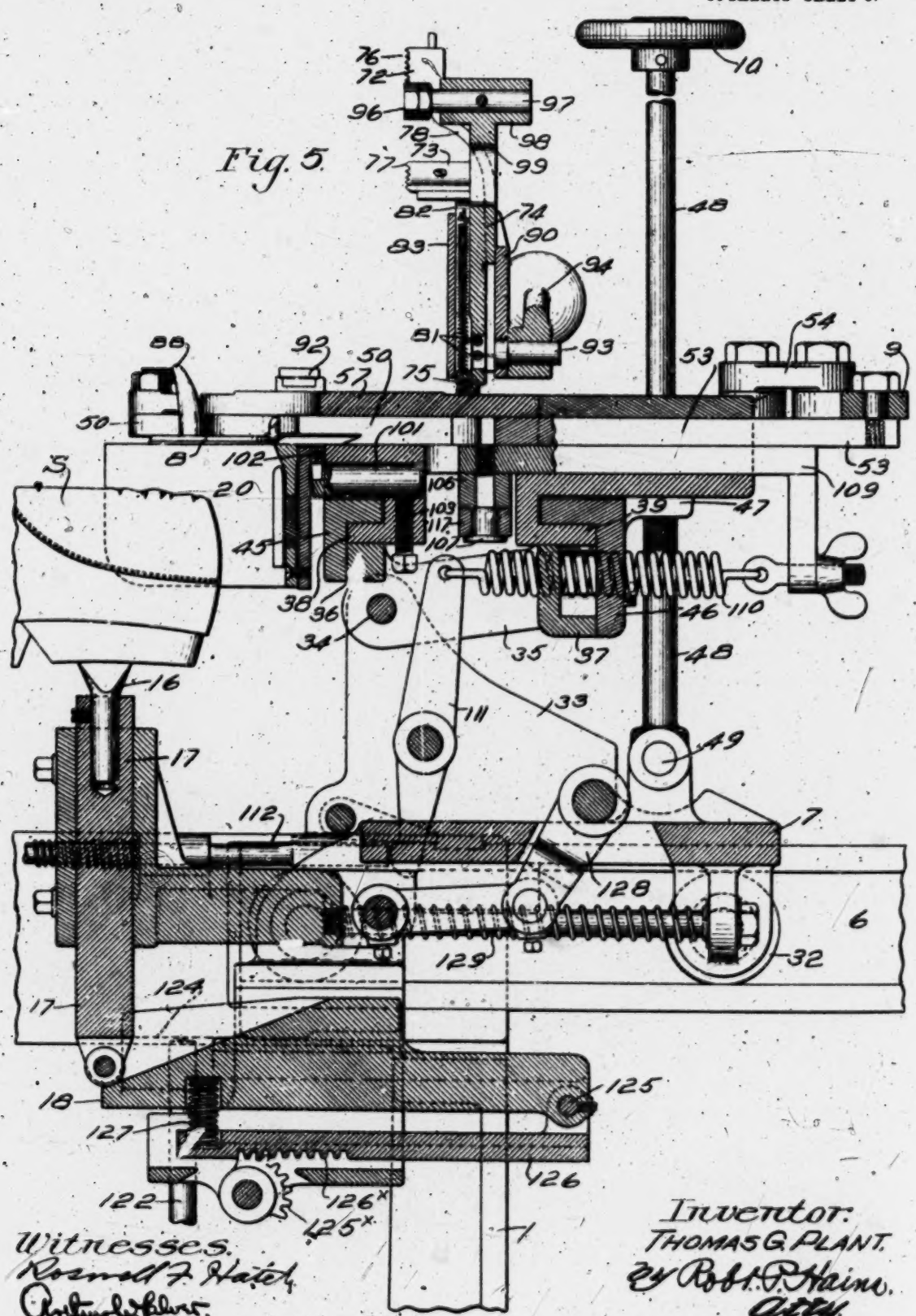
LASTING MACHINE.

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958,280. Patented May 17, 1910.

14 SHEETS—SHEET 3.

Fig. 5.



Witnesses.
Roswell F. Hatch
Chas. Tumbleston Albert.

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LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

958,280.

Patented May 17, 1910.

14 SHEETS—SHEET 4.

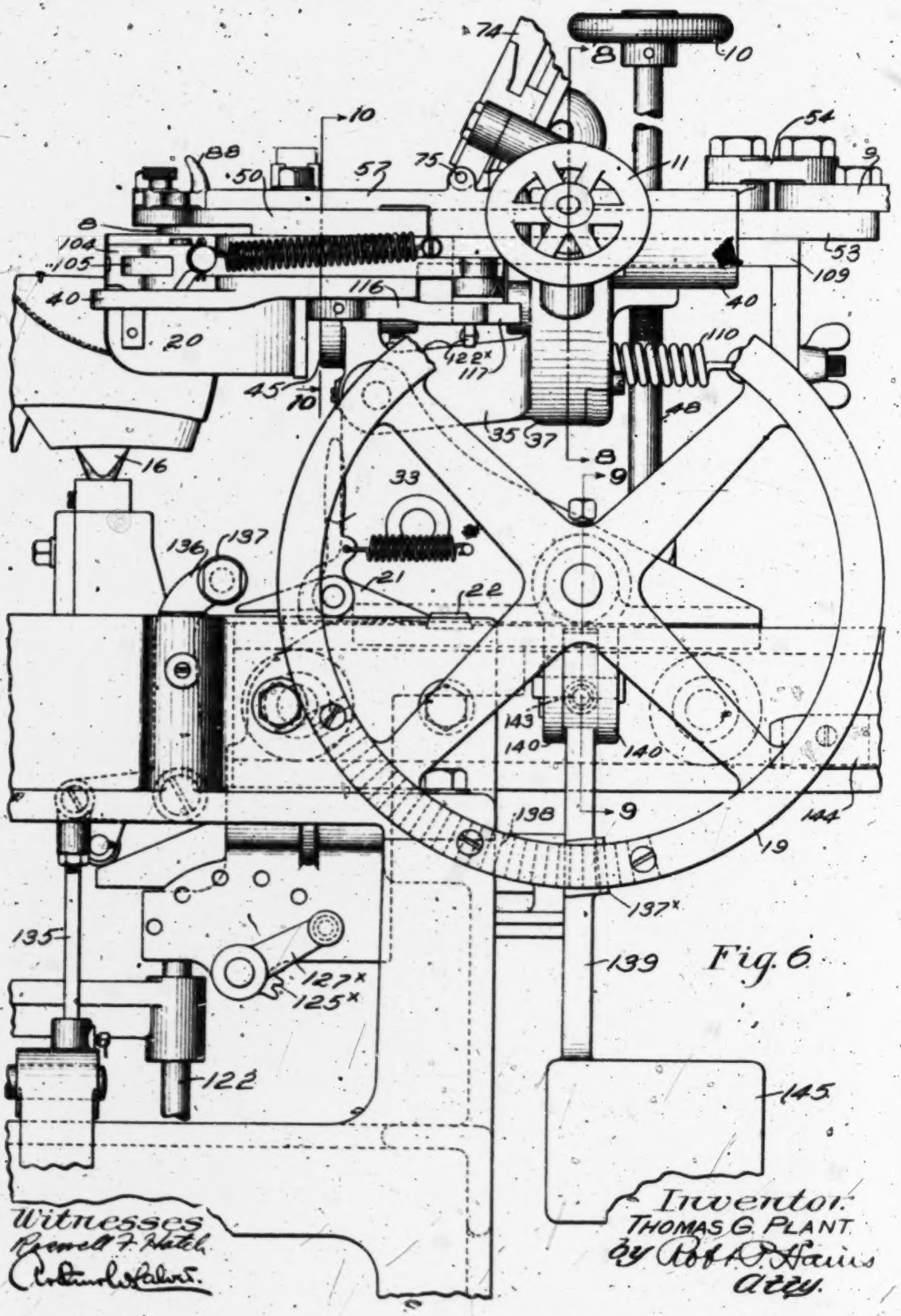


Fig. 6.

Witnesses
Russell F. Hatch
Robert W. Adams.

Inventor:
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T. G. PLANT.

LASTING MACHINE.

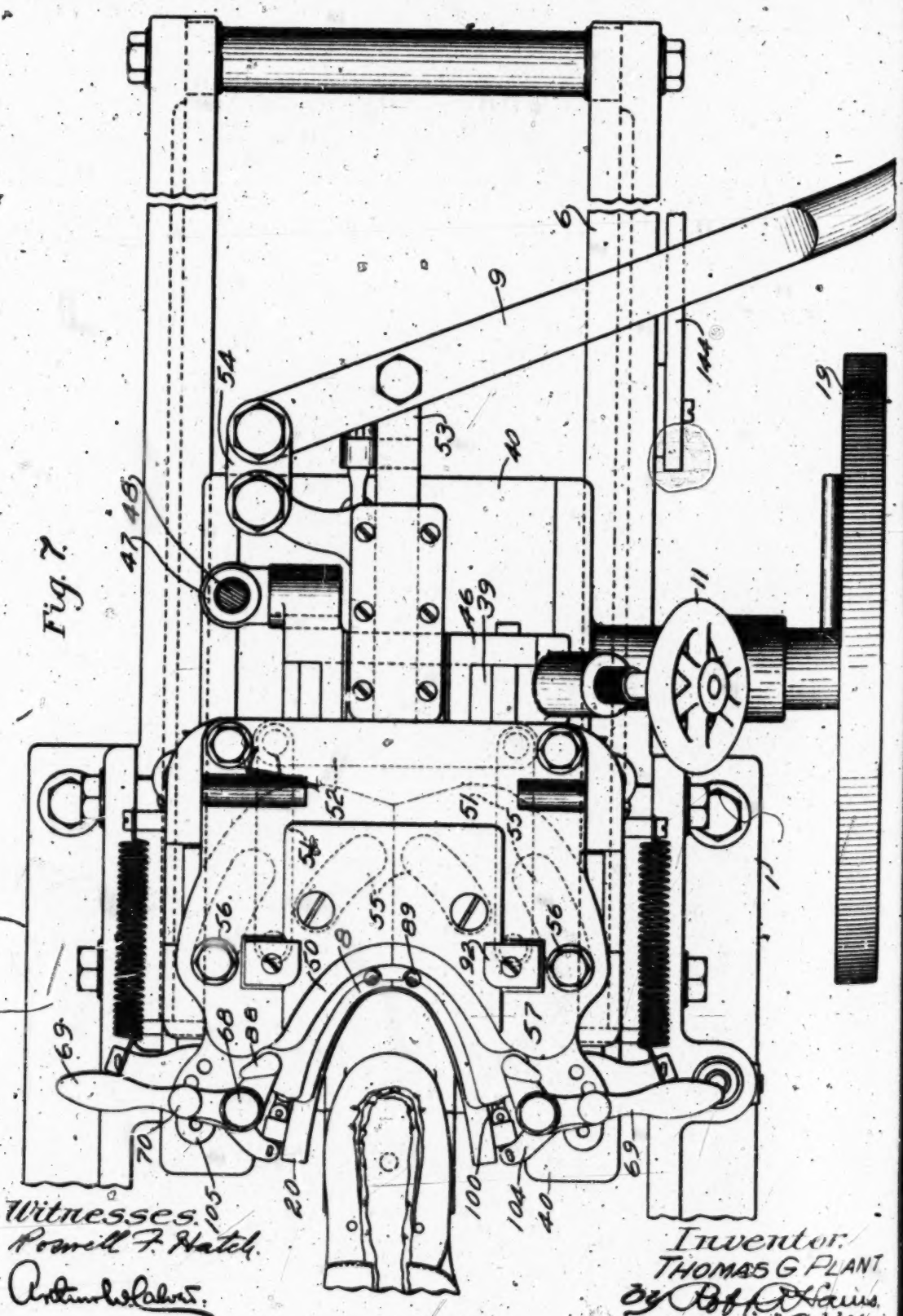
APPLICATION FILED SEPT. 28, 1908.

958,280.

Patented May 17, 1910.

14 SHEETS—SHEET 5.

Fig. 7.



Witnesses.
Roswell F. Hatch.
Arthur W. Calvert.

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LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

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14 SHEETS—SHEET 6.

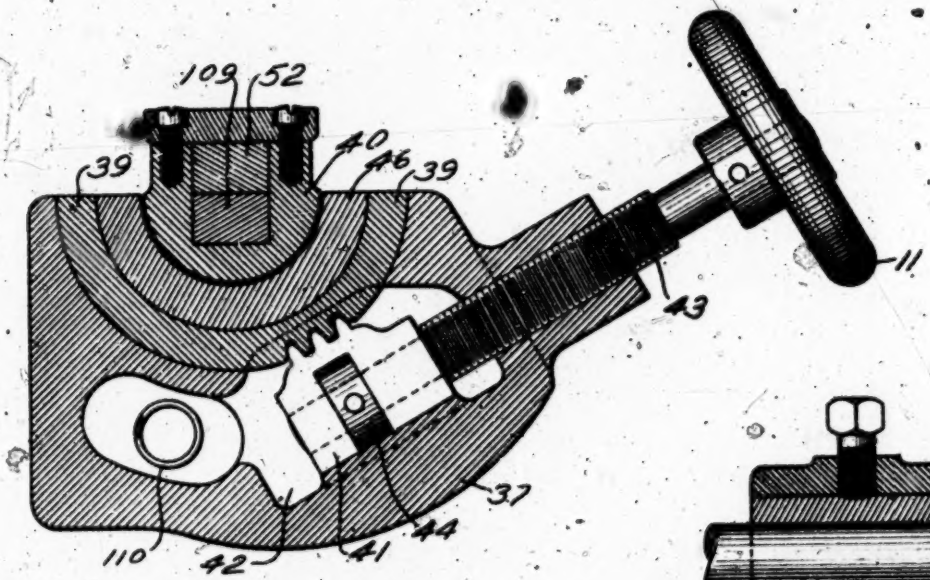


Fig. 8.

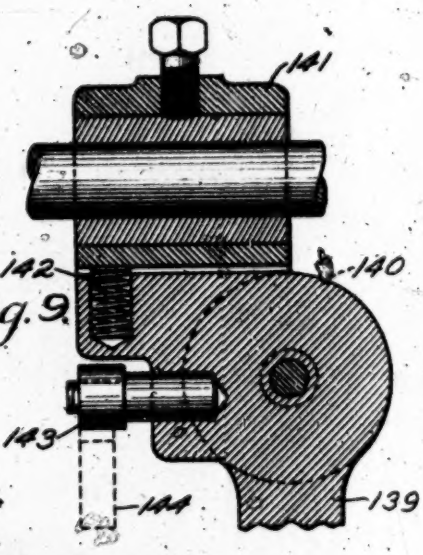


Fig. 9.

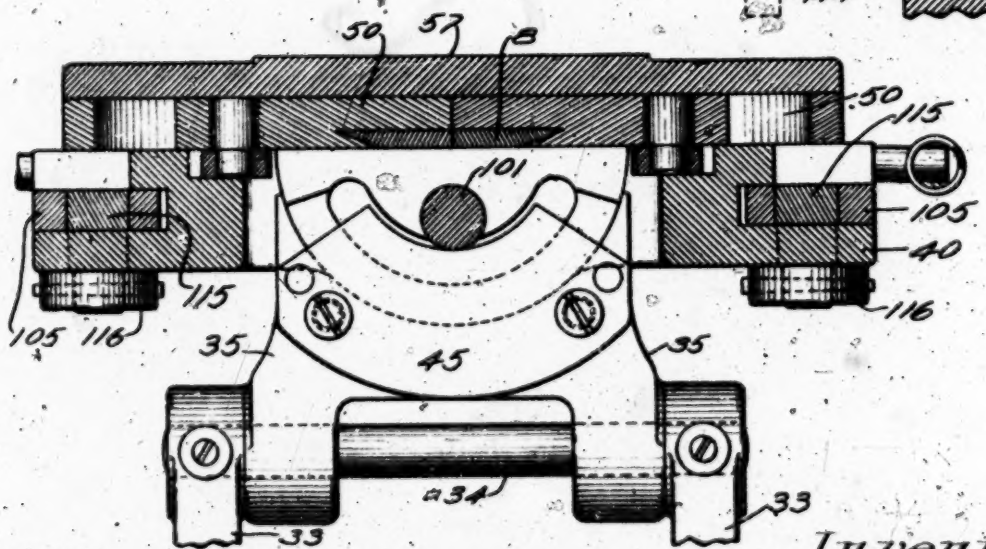


Fig. 10.

Witnesses.
Roswell F. Hatch.
Arthur W. Cabus.

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Atty.

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T. G. PLANT.

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APPLICATION FILED SEPT. 28, 1908.

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14 SHEETS—SHEET 1.

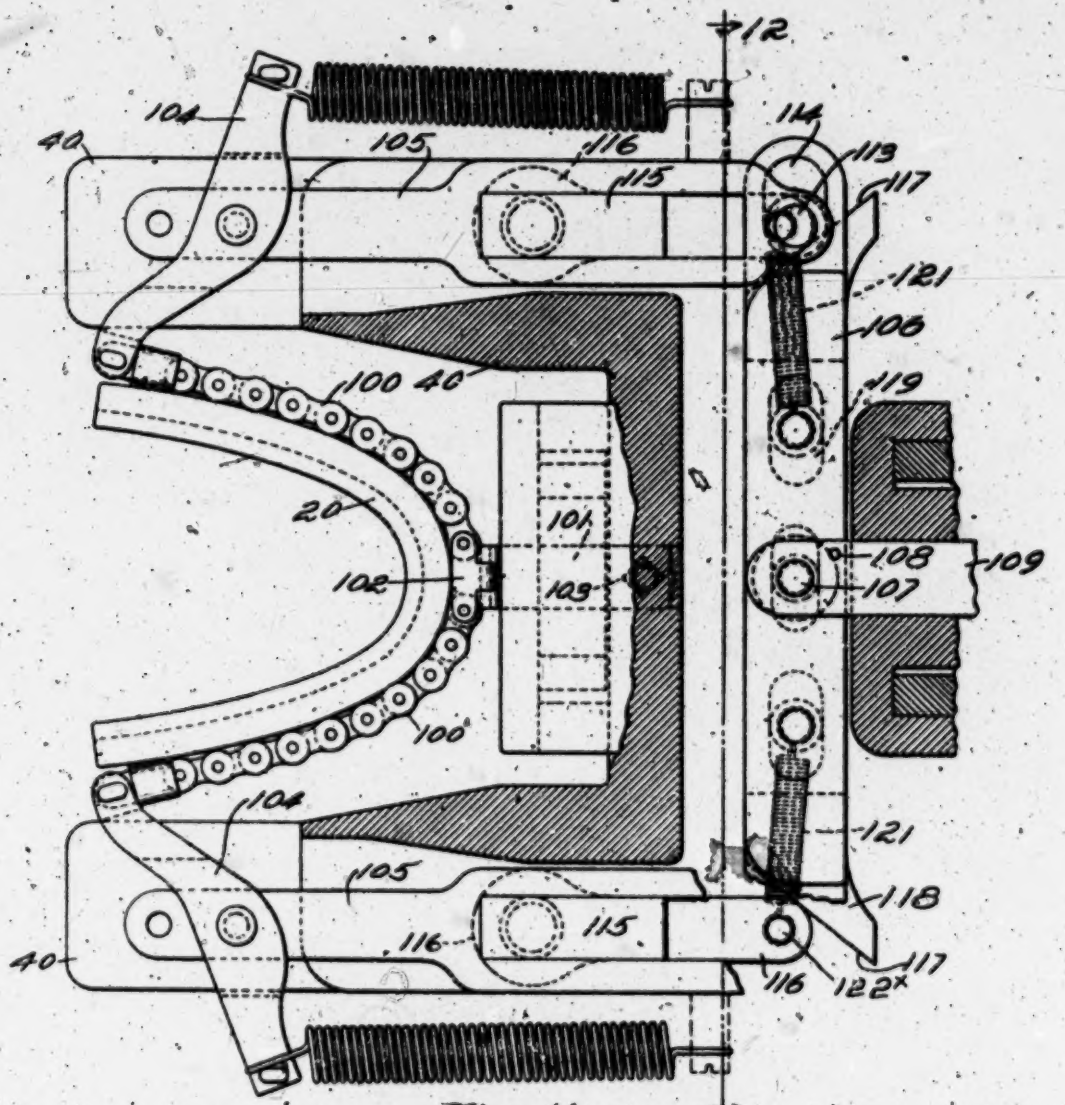


Fig. 11.

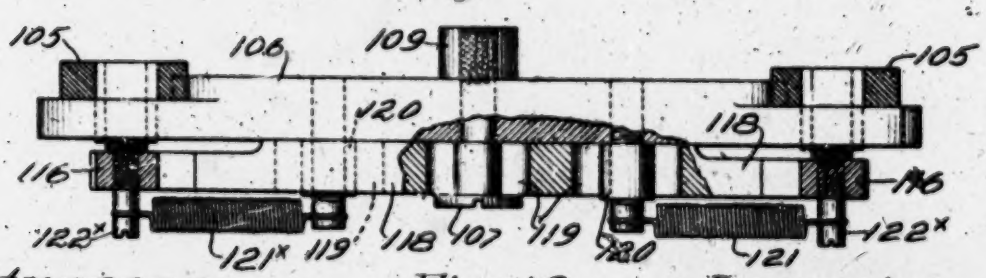


Fig. 12.

Witnesses.
Roswell F. Hatch.
Arthur L. Calver.

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LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

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14 SHEETS—SHEET 8.

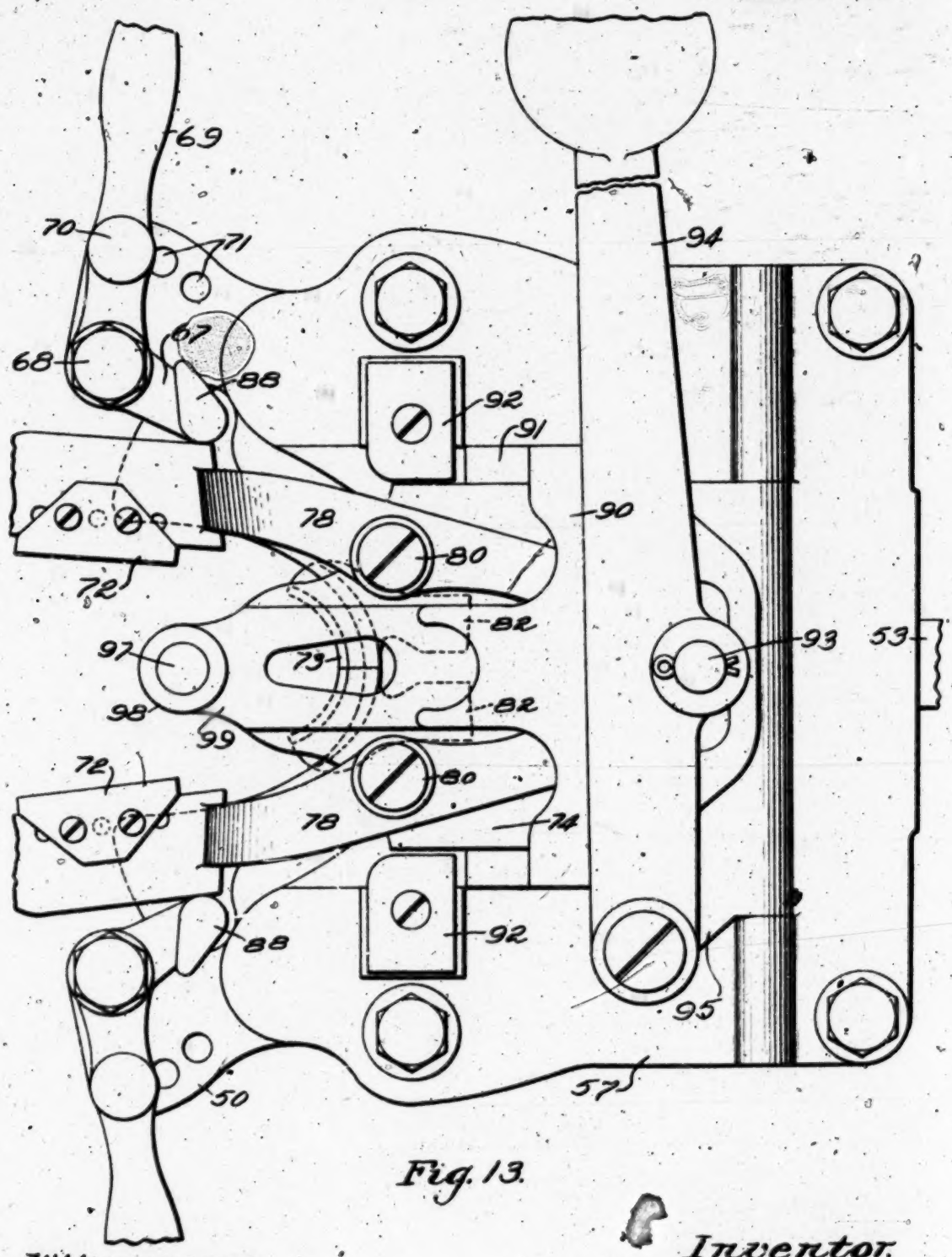


Fig. 13.

Witnesses.
Roswell J. Hatch
Antonia W. Coles.

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Atty.

LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

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14 SHEETS—SHEET 9.

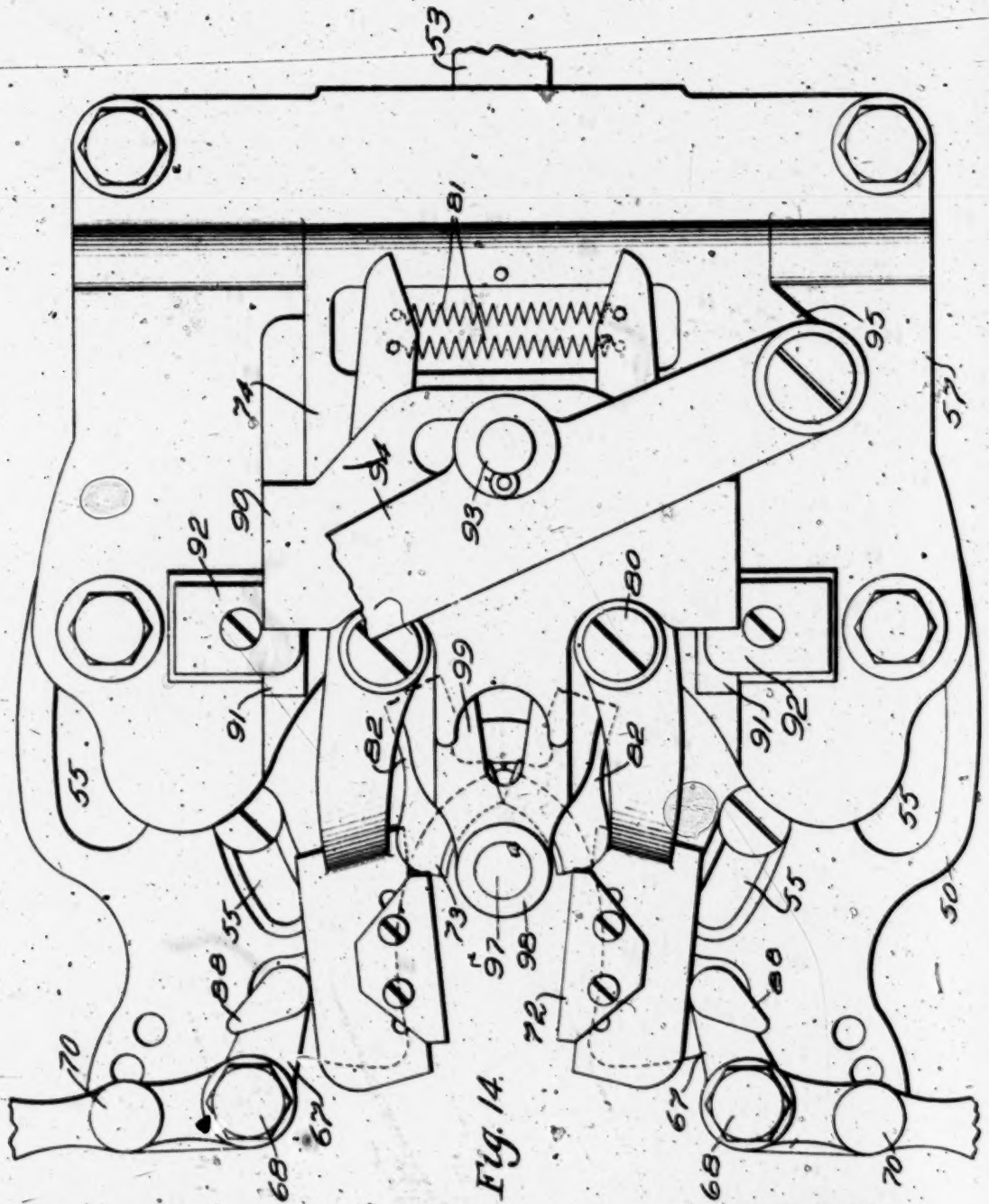


Fig. 14.

Witnesses.
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Antonia Calvert.

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T. G. PLANT.

LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

958,280. Patented May 17, 1910.

14 SHEETS—SHEET 10.

Fig. 15.

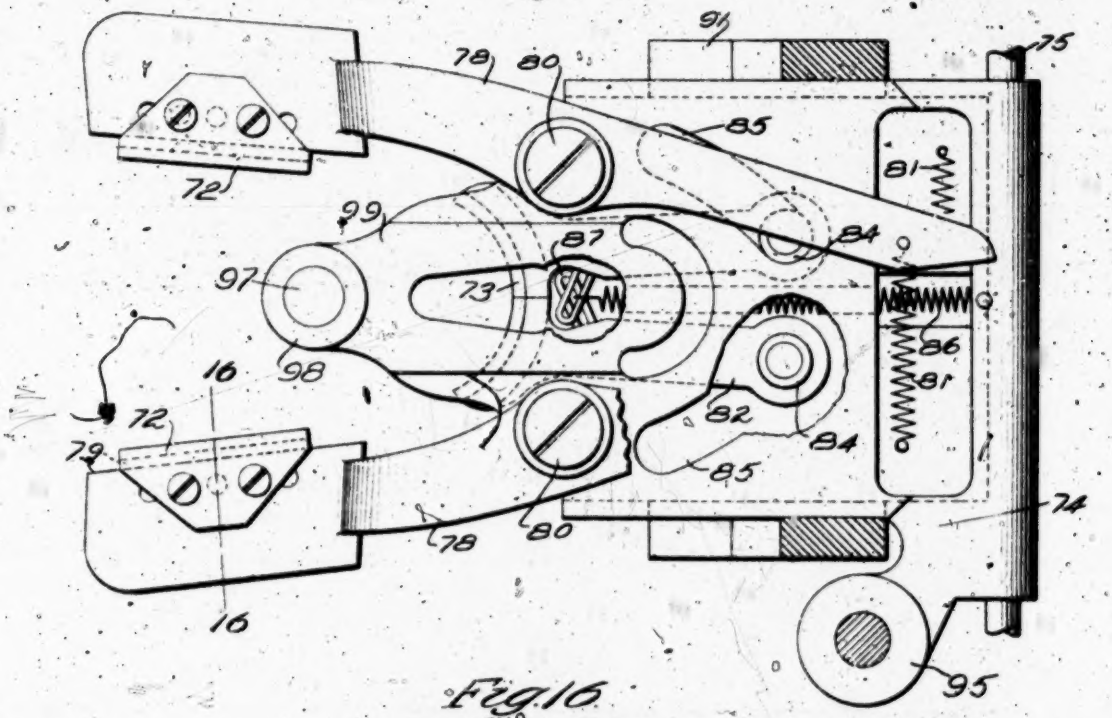


Fig. 16.

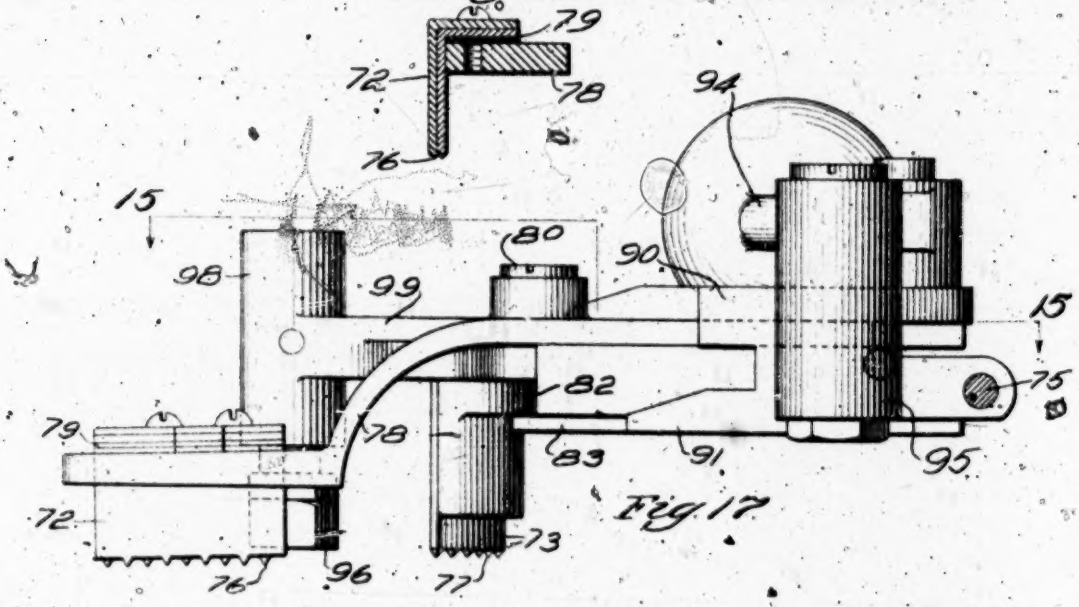


Fig. 17.

Witnesses.
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LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

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14 SHEETS—SHEET 11.

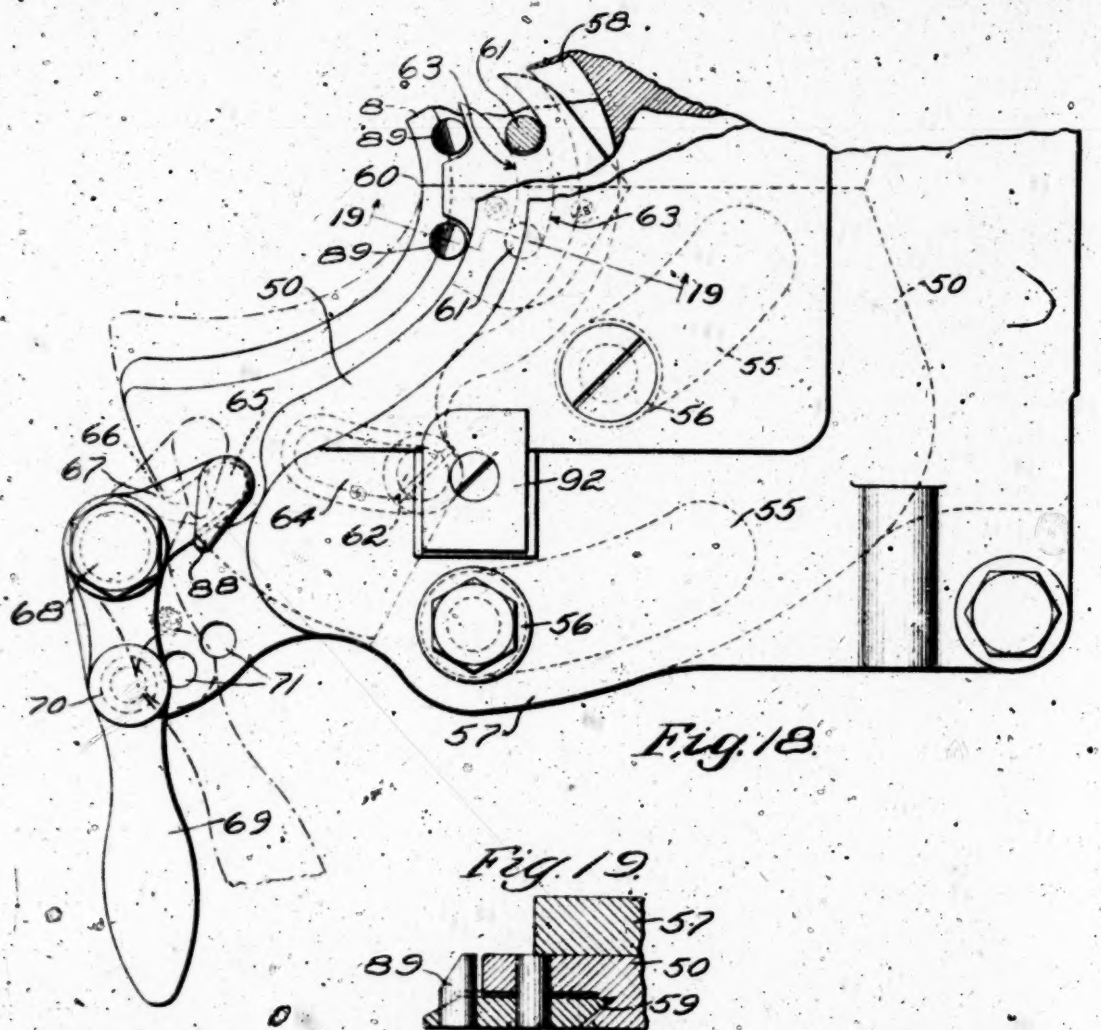


Fig. 18.

Fig. 19.

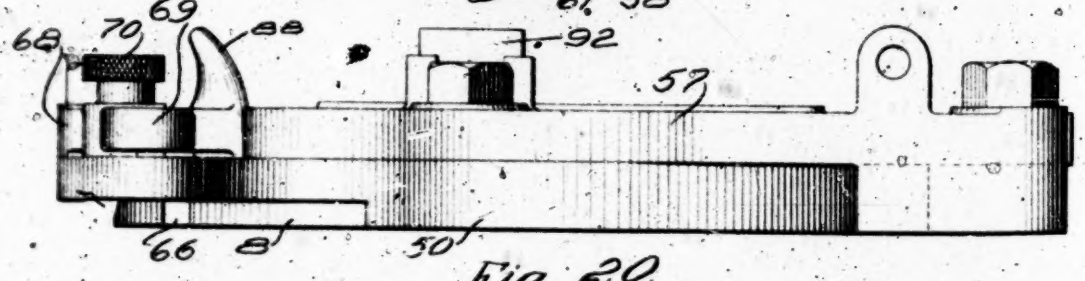


Fig. 20.

Witnesses:
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Arthur W. Labot.

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T. G. PLANT.

LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

958,280.

Patented May 17, 1910

14 SHEETS—SHEET 12.

Fig. 21

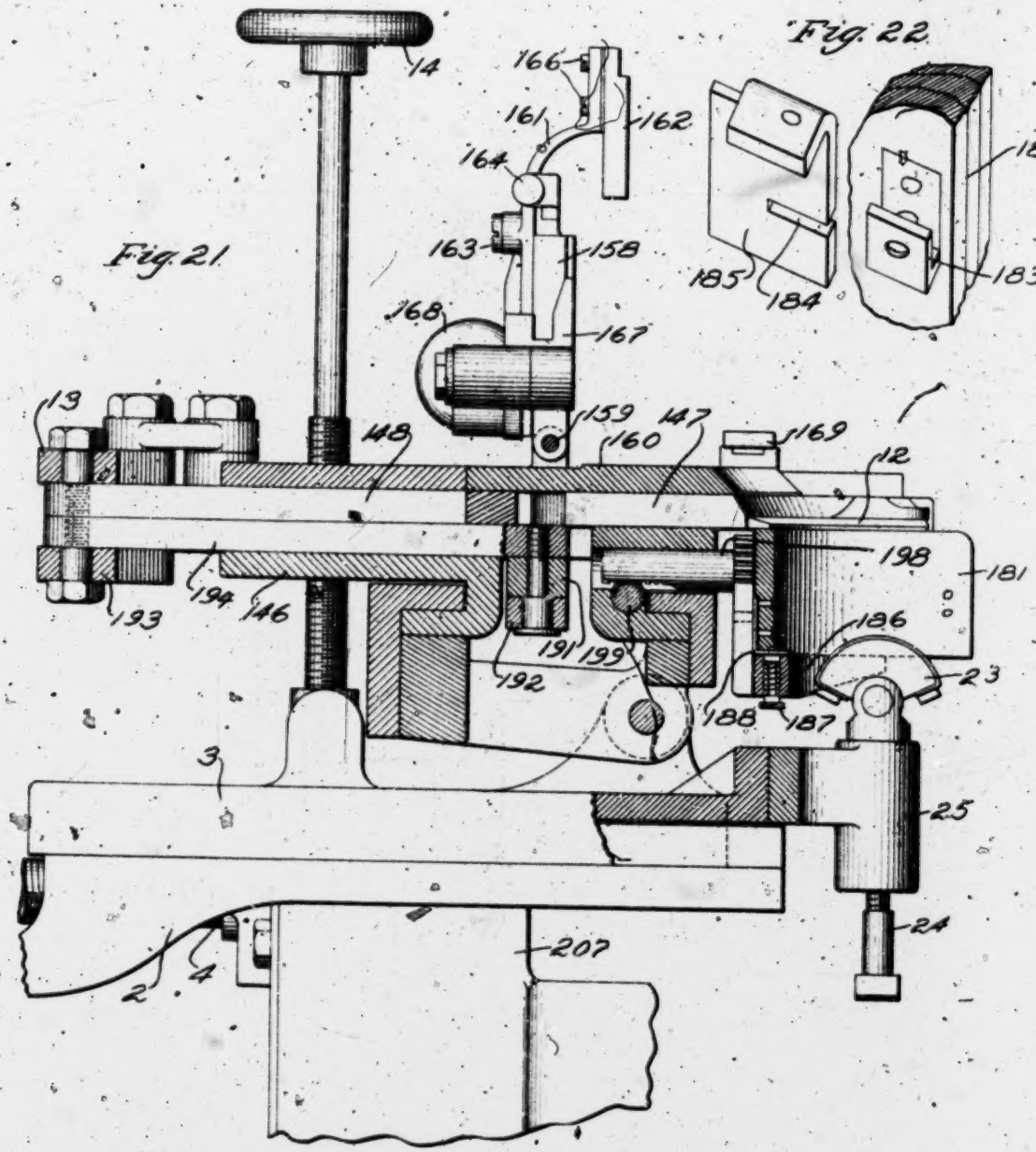


Fig. 22

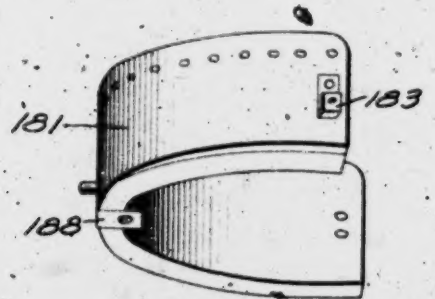


Fig. 23.

Witnesses.
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Arthur W. Peters.

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LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

958,280. Patented May 17, 1910.

14 SHEETS—SHEET 11.

Fig. 24

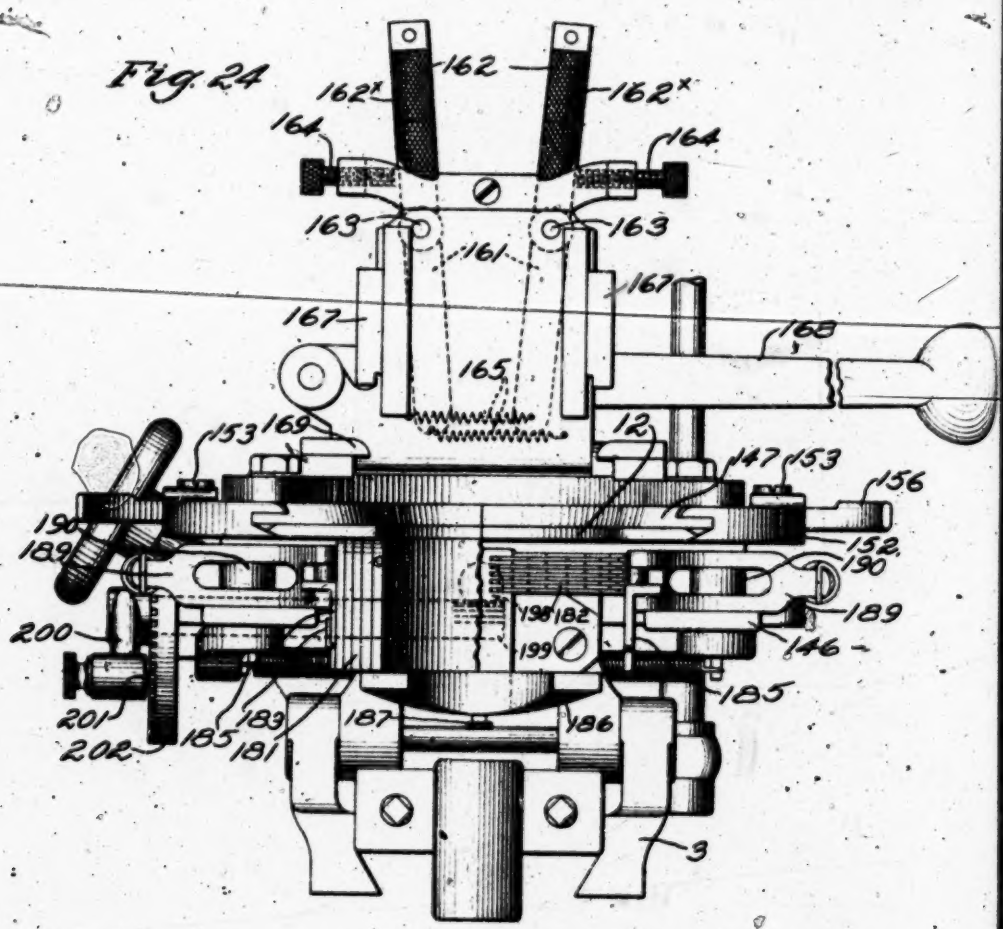


Fig. 25

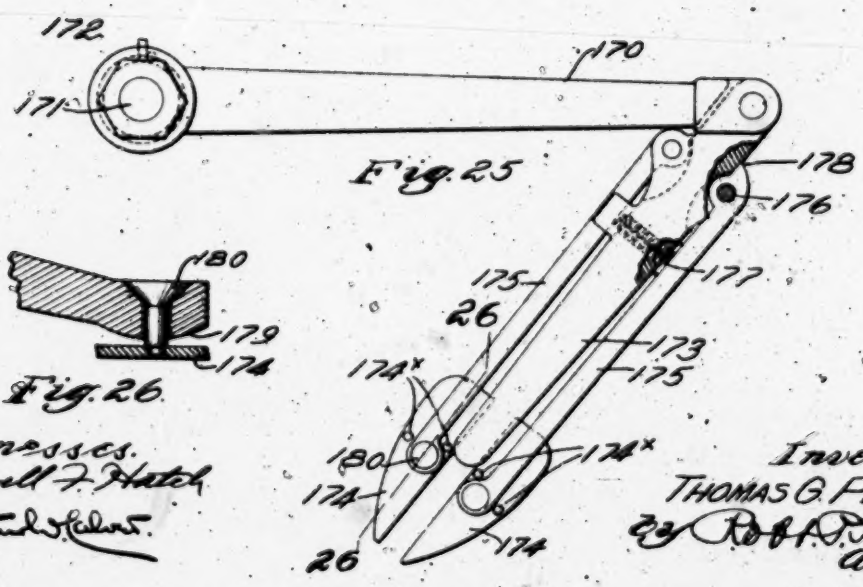


Fig. 26

Witnesses.
Roswell F. Hatch
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T. G. PLANT.

LASTING MACHINE.

APPLICATION FILED SEPT. 28, 1908.

958,280.

Patented May 17, 1910.

14 SHEETS—SHEET 14.

Fig. 27.

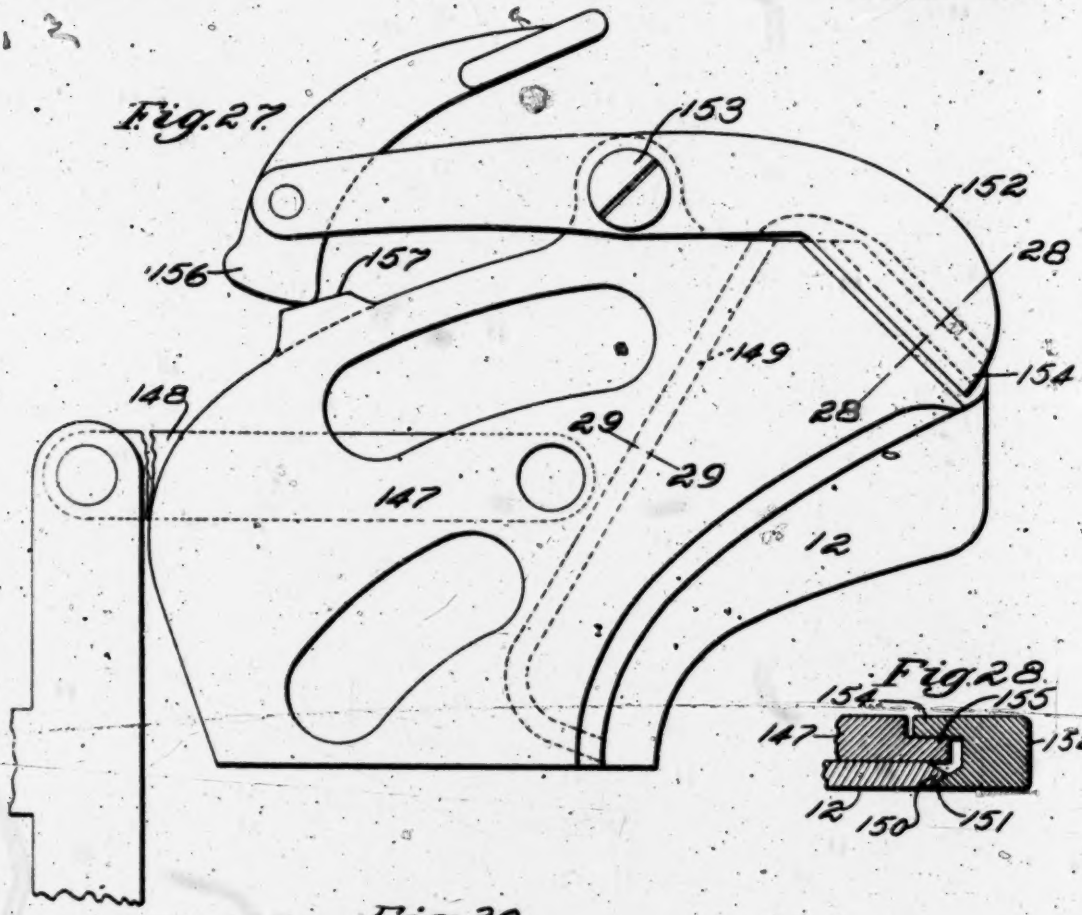


Fig. 28.

Fig. 30.

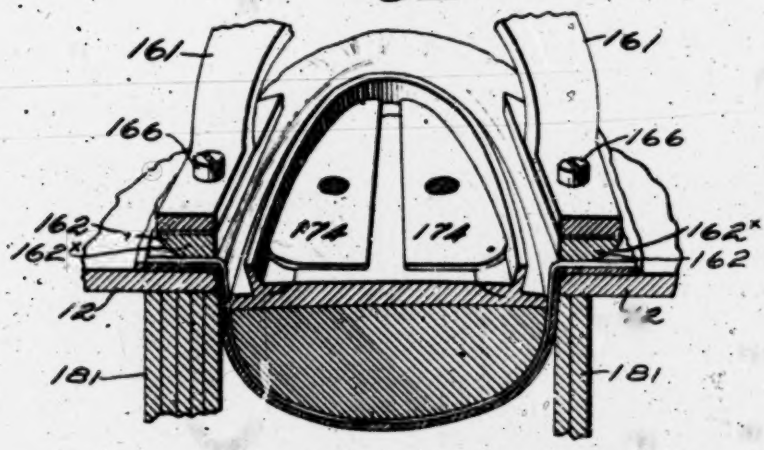




Fig. 31.

Witnesses.
Powell F. Hatch
A. Hatch Jr.

Fig. 29.



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UNITED STATES PATENT OFFICE.

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LASTING-MACHINE.

958,280. Specification of Letters Patent. Patented May 17, 1910.

Application filed September 28, 1908. Serial No. 455,159.

REISSUED

To all whom it may concern:

Be it known that I, THOMAS G. PLANT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to machines for lasting boots and shoes, and more particularly to machines of the bed lasting class employing wipers for the lasting operation.

The invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings: Figure 1 shows, in side elevation, a typical bed lasting machine embodying one form of the invention; Fig. 2 is a detail in end elevation showing the releasing lever for the heel elevating post; Fig. 3 is a detail in sectional elevation of the elevating devices for the toe lasting head; Fig. 4 is a transverse section in elevation, on a larger scale, showing the heel lasting head; Fig. 5 is a vertical longitudinal section of the heel lasting head on the line 5—5, Fig. 4, showing a last in position on the heel pin; Fig. 6 is a side elevation of the heel lasting carriage and other parts immediately associated therewith; Fig. 7 is a plan view of the heel carriage with the supplemental carrier and lasters removed; Fig. 8 is a transverse section in elevation of a portion of the heel lasting head, taken on the line 8—8 in Fig. 6, and looking in the direction of the arrow; Fig. 9 is a transverse section in elevation of a portion of the ratchet releasing lever for the heel head, the said section being taken on the line 9—9 in Fig. 6; Fig. 10 is a transverse section of the heel lasting head on the line 10—10 in Fig. 6; Fig. 11 is a plan in partial section of the heel lasting head with portions removed to show the heel band and the actuating devices therefor; Fig. 12 is a transverse section in elevation on the line 12—12 in Fig. 11; Fig. 13 shows in plan, on a still larger scale, the relation of the heel wipers to the lasters or grippers in one position; Fig. 14 is a similar view showing the wiper and lasters or grippers in another position; Fig. 15 is a plan in section on the line 15—15, Fig. 17, showing the construction of the lasting or gripper-fingers; Fig. 16 is a transverse section in elevation taken on the line 16—16 in Fig. 15, showing the construction of one of the side grippers; Fig. 17 is a side elevation of the supplemental carrier and lasting or gripper fingers; Fig. 18 is a plan view, partly broken away, showing the construction of the wipers and wiper cams for the heel head; Fig. 19 is a detail in section taken on the line 19—19 in Fig. 18; Fig. 20 is a side elevation of the wiper cams; Fig. 21 is a central longitudinal section in elevation taken through the toe lasting head; Fig. 22 is a detail in perspective showing the mode of attaching the ends of the toe band or pad to its support; Fig. 23 is another perspective showing the toe band or pad; Fig. 24 is an end elevation of the toe lasting head looking from the center of the machine; Fig. 25 is a plan view of the hold-down; Fig. 26 is a detail in transverse section taken on the line 26—26 in Fig. 25; Fig. 27 is a plan showing one of the toe wipers and its cam carrier; Fig. 28 is a detail in section taken on the line 28—28 in Fig. 27; Fig. 29 is a similar section taken on the line 29—29 in Fig. 27; Fig. 30 is a perspective showing the relation of the toe lasters to the wipers in one position of the latter during the lasting operation; and Fig. 31 is a detail in sectional elevation showing the wipers and lasters in a different position.

While many features of the invention may have general application to lasting machines of widely varied types and of materially different construction from the machine herein disclosed, for the sake of illustrating one concrete embodiment of the invention, the same is shown as applied (Fig. 1) to a well-known type of bed lasting machine, to which general type, moreover, the invention in certain of its aspects has particular and special application.

In the machine shown (Fig 1) the frame 1 is provided at the left with a suitable slideway support 2 for the longitudinally adjustable toe lasting head 3, movable from left to right to accommodate shoes of different length by the adjusting screw 4 and hand wheel 5. At the opposite end of the machine

on the overhanging trackway 6 is a supporting carriage for the heel lasting head 7. The heel lasting wipers, indicated at 8, are opened and closed by the wiper lever 9, and are angularly adjustable longitudinally to accommodate the spring of the last by means controlled through the hand wheel 10 and adjustable transversely to accommodate the roll of the last by the hand wheel 11. Similarly, at the toe lasting head for opening and closing the toe wiper plates, represented at 12, there is provided the wiper lever 13, and for their angular adjustments longitudinally and transversely the hand wheels 14 and 15 respectively.

At the heel lasting carriage there is provided a heel pin 16 sustained (see Fig. 5) by the heel post 17, the latter adjustably supported as by the underlying inclined cam or wedge 18. In the employment of the machine the jacked shoe, designated at S (Fig. 5), is elevated on the said wedge by means controlled through the hand wheel 19 (Fig. 1) and its heel retracted into the heel band 20, the same movement of the hand wheel serving to draw the carriage toward the center of the machine where it is positioned by engagement between the pivoted latch 21 and the stationary catch 22 on the frame of the machine. The toe of the last, when thus positioned, is held over a toe pad 23, on the toe post 24, vertically slidable in the bracket 25 on the toe lasting head. The toe rest rests upon a hinged table 26 controlled by an underlying cam and cam shaft. The details of the cam shaft are not herein shown, but may be of a construction well-known in machines of this type adapted, as well understood, when the shoe has been positioned as described, to be set in operation by pressure on the knee lever 27, to raise the toe pad 23 against the shoe and, at the same time, clasp the heel band about the heel of the shoe. The hold-down 28 being then drawn down against the upturned sole of the jacked shoe by means of the foot lever 29, the shoe is placed in readiness for the lasting operation. After the leather has been wiped over the insole and fastened thereto, the knee lever 27 is pressed again to turn the cam shaft, causing the toe pad to be dropped, the hold-down loosened and the heel lasting carriage released and moved back to its outer position along the track 6 which carriage movement, in turn, causes the heel band to open and the heel post to drop. These movements are well understood in lasting machines of this type, and the specific constructional details of the mechanisms producing them require no further illustration or explanation save in so far as they may incidentally relate to improvements herein subsequently described.

Referring first to the construction of the heel and toe lasting heads and the devices for adapting the wipers to the roll or swing of the last, these will be best understood by reference to the heel lasting carriage and particularly to Figs. 4, 5, 7, 8 and 10. For the angular longitudinal wiper adjustment, the heel lasting carriage or base 7 (Fig. 5), which tracks upon the rollers 32, is provided at each side with upright ears 33 between which is hinged upon the transverse rod 34 the intermediate support or saddle 35. The latter comprises longitudinal arms connected by front and rear transverse members 36 and 37 respectively, which latter are formed to present curved segmental guideways (Figs. 5, 8 and 10) and afford a sliding support for the correspondingly fashioned flanged supporting portions 38 and 39, which depend from the wiper carrying support 40. The wiper support 40 can be angularly adjusted about a longitudinal axis through sliding movement of the segmental supporting flanges 38 and 39 on their curved guideways, which movement herein is imparted (Fig. 8) by a sliding rack block 41 located within a chamber 42 in the rear transverse saddle member 37, the block being provided on its upper face with teeth meshing with corresponding teeth on the under face of the supporting flange 39. The rack block may be moved in either direction from the position shown in Fig. 8 to tip the wiper support by turning the hand wheel 11 and the attached screw 43, the latter having threaded engagement with the walls of the saddle. The screw has a reduced portion adapted to turn freely in the block, but longitudinally fixed therein, by the collar 44 working in a transverse slot in the block. The supporting segments 38 and 39 are held in engagement with the guideways by flanged gibs 45 and 46 respectively, which overlie the curved upper faces of the flanged supports but are bolted to the guideway segments 36 and 37 respectively. For the angular adjustment of the wiper carrier longitudinally and about the hinge 34 the flanged gib 46 is provided with a bracket 47 (see Figs. 5 and 7), which has threaded engagement with the vertical adjusting screw 48, the latter provided with the hand wheel 10 and having a combined swivel and pivotal connection, as at 49, to the carriage 7. It will be noted that the forward segmental guide 36 and its gib 45 provide a bearing for the sidewise rocking wiper-support extending close to the heel band and well under the sliding wiper carrying cams 50.

The construction of the devices for adjusting the wipers on the toe lasting head is substantially the same as that described in connection with the heel lasting head and will be readily understood from the drawings without further explanation.

Passing now to the construction of the wipers for the heel lasting head, these are carried on the usual wiper carrying plates

or cams 50, which latter are secured by means of the rearwardly extending links 51. Fig. 7, the cross-bar 52 and the tail piece 53 to the wiper operating lever 9, the latter (Fig. 7) pivoted to an arm 54 secured to the wiper support 40. As usual, the wipers are given a combined advancing and closing movement by the operating lever through the provision of curved cam slots 55 (Fig. 18) in the wiper plates with which are engaged rollers 56 carried on fixed studs, the latter connecting the underlying wiper carrier 40 and the overlying plate 57, between which the wiper plates are adapted to slide. While the wipers are usually arranged in symmetrical relation to the cams so that they close in from the same position relatively to the center line of advance, in lasting shoes where the swing of the last presents wide variations between rights and lefts, so that the inside shank of the last presents a deeply retreating face, it is often desirable to shift the inside wiper and swing it inward so that it will start to close farther in toward the center line of the head. One feature of the present invention lies in the provision of means for quickly adjusting either or both wipers for different swing of the lasts, as, for instance, for rights or lefts. Various ways of securing this adjustment may be employed, but herein a wiper seat is provided (Figs. 18 and 19) on the under face of each wiper cam 50 by means of a beveled lip or shoulder 58 which underlies the beveled edge 59 of the wiper plate 8. The beveled edge of the plate and the lip against which it fits, as viewed in plan (Fig. 18), are curved preferably about the center of curvature of the cam directing slots 55. Each cam carrier is provided with studs 61 and 62 which engage curved positioning slots 63 and 64 in the corresponding wiper, the said slots having the same center of the curvature 60, so that the wipers may, if desired, either or both be adjustably swung on the cams about the point 60 which coincides with the center of opening and closing movement. Each wiper plate is held adjustably fixed on its carrying cam by any suitable means such, for example, as the down turned locking pin 65 which engages a suitably shaped slot 66 in the outer edge of the wiper plate to hold the latter rigidly fixed. The pin, however, is carried by an arm 67 pivoted at 68 upon the wiper carriers and provided with the handle 69 and the removable positioning pin 70, which latter may be inserted in any one of several openings 71 in the wiper carrier to variously fix the position of the locking arm. With the positioning pins in the outer one of the openings 71 (as shown in Fig. 18), the wiper plates are held in their normal positions symmetrically arranged relatively to the central plane of the head and with their inner edges in contact. By withdrawing its positioning pin 70 and turning its locking levers 67 to a different position, however, either wiper may be swung inwardly, as, for example, to the position shown by dotted lines in Fig. 18, thereby causing it to start and finish its closing movement nearer the center line of the last.

In the disclosed machine there are provided, in addition to the wipers, auxiliary lasting devices which act to increase the draft on the stock when wiped over the last, as well as to direct the draft inward over the shank and rearward toward the center of the heel seat, such auxiliary devices also herein preferably being employed to prevent the slackening of the stock when the wipers are backed off and partially withdrawn preparatory to applying the fastening. Herein the said auxiliary devices comprise (see Figs. 5 and 15) pairs of grippers 72 for increasing and directing the draft on the stock at the side of the heel near the shank, and additional grippers 73 for increasing the draft at the end or rear of the heel. Both pairs are mounted upon the supplemental head 74, hinged by the rod 75 to the heel lasting head so that they may be thrown up out of the way into the position shown in Fig. 5. The grippers are provided with down turned lips presenting gripping means, such as the points 76 and 77 respectively, which, when the head is turned down (Fig. 13) are adapted to penetrate and positively engage the stock in front of the working edges of the wipers and to be moved in and over the last (Fig. 14) in advance of the wipers. The side grippers 72 are removably bolted or screwed to the ends of fingers 78, provision being made for adjustment to accommodate different thicknesses of stock, by interposing one or more removable shims 79, and for longitudinal adjustment to change the reach of the grippers toward the shank of the last by providing a plurality of screw holes in the fingers. The fingers 78 are pivotally secured to and above the head 74 by means of studs 80 and have their rearwardly projecting ends drawn together by springs 81 which tend normally to spread apart the side grippers, as shown in Fig. 15.

The heel lasting grippers 73 are carried on arms 82 which have sliding movement between the head 74 and the underlying plate 83 (Figs. 4 and 5) secured thereto. When the heel grippers are advanced, as will be described, their movement is directed by rollers 84 carried by the rear ends of the arm 82 and engaging curved guideways 85 formed in the head, the guideways being located in such relation to the directing slots for the wiper cams that the heel lasting grippers execute a closing-in movement conforming to that of the wipers. The heel

lasters are normally retracted to the open position shown in Fig. 15 by the spring 86 having one end fixed to the head and the other connected in common to the pins 87 fastened one to each of the arms 82.

When the supplemental head 74 is turned down to use the lasters, the grippers 76 are guided into position (see Fig. 13) to overhang the front edge of the wipers by contact between the outer beveled edges of the down-turned gripper lips and the upright horn-shaped abutment 88 presented by the locking lever 67 on each wiper carrier. Likewise the grippers 73 are positioned to overhang the wiper edges by guiding contact with the beveled top edges of the upright pins 89 carried each by one of the wiper plates (see Figs. 5 and 18). In this position of the grippers, any closing-in movement of the wipers will be accompanied by a corresponding closing-in movement (see Fig. 14) of the grippers due to the pressure of the abutments 88 against the side grippers and the pins 89 against the heel grippers, the said pins and abutments acting as the means for advancing the grippers over the last.

Means are provided to depress the grippers at will and cause the points 76 and 77 to penetrate and grip the stock. This is accomplished by providing on the head 74 a cap plate 90 adapted to slide lengthwise the head. The cap plate is provided with shoes 91 underlying the edges of the head, which shoes present, each on its upper face, an incline adapted to engage with the under side of an overhanging ear 92 (see Fig. 7) the latter bolted to the plate 57 on the wiper support, so that, with the lasters turned down and the cap plate advanced, the inclined shoes will forcibly depress the entire supplemental head about its hinge and cause the laster points to dig into and take hold of the stock. To advance the sliding cap for the depression of the grippers, the cap has jointed attachment at 93 (Figs. 5 and 13) to the hand lever 94, the latter pivoted on the bracket 95 which is secured to the head 74.

Means preferably are provided and associated with the grippers to position or level the shoe with respect to the lasting devices and acting also to prevent such an approach of the gripper teeth to the insole as might cause them to penetrate too deeply and tear the stock. Such means are herein comprehended in a down hold foot comprising the adjustable head 96 carried by the threaded pin 97 depending from the bracket 98. The latter is supported by an arm 99 on the supplemental head between the lasters, so that the down hold may be depressed against the upturned insole at the heel seat and beyond the range of wiper action. By adjusting the head 96 on the pin the penetration of the gripper into the stock may be regulated.

In the use of the heel lasters, the head having been swung down, the lasters assume the relation to the wipers represented in Fig. 13. The hand lever 94, being then swung over to the position shown in Fig. 14, causes the teeth of the lasters to grip the stock and, when the wipers are advanced, move from the position shown in Fig. 13 to that shown in Fig. 14. In executing this movement the heel lasters advance and close in substantial correspondence with the wipers supplementing the frictional hold of the latter. The side lasters, not only likewise increase the draft on the stock, but, being pivoted on the supplemental head and projecting (Fig. 13) well beyond the forward limits of the wipers, engage portions of the stock not initially touched by the wipers, which portions, however (see Fig. 14), are drawn or held back into the range of wiper action at the close of the wiper advance. With end wipers, as ordinarily used, the draft upon the stock, while inward over the insole, is also forward, this tending to slacken the stock overlying that portion of the last not reached by the wipers until near the close of their movement, as, for example, adjacent the inside shank portion of the shoe. Since the side grippers have a closing-in movement only, while the wipers both close in and advance, the side grippers act to draw the stock relatively toward the advancing wipers, preventing the forward draft, due to the advance of the latter, from slackening the stock over the fore portions of the heel seat. Thus, through the use of the auxiliary lasters, the stock from all sides of the heel, including the inside concaved portion of the shank, can be drawn in snugly toward and over the heel seat and can be broken down by the advancing wipers. Having wiped in the stock as described, the operator may now return the wipers to a position near the edge of the insole preparatory to applying the fastening. The depression of the lasters, due to the cam plate 90, causes them to remain fixed on the retraction and opening of the wipers, preventing such wiper movement from being accompanied by any slackening of the stock. With the wipers retracted, the lasting lever 94 may be swung back to release the lasters and the head 74 raised to permit application of the fastening.

In the case of lasts having an extreme swing, it will often be necessary to adjust the grippers so that the movement of the inside gripper, like that of the inside wiper, shall be started nearer the center line of the last. While such adjustment might be independent and separate, herein it is made automatically consequent on the adjustment of the wiper plates for, with either of the

latter shifted to one side of its normal position, when the head is depressed, the corresponding lasters will still find their proper positions by engagement with the abutment 88 and pin 89 and lie closely adjacent the active edges of the wipers, as shown in Fig. 13. The beveled top of the pins 89 and of the horn 88 is so shaped that the lasters are correctly positioned and properly advanced in whatever position of adjustment the wiper plates may be placed.

Referring now to the heel band 20 for the heel lasting head, the same comprises (Figs. 5 and 11) a pad or facing of leather or other suitable material supported by the flexible sprocket chain or carrier 100. The latter is suitably supported by the rearwardly directed pin 101 on which it is hinged by the link 102 so as to rock slightly for adaptation to the last. The pin is adjustably held in the wiper support by the set screw 103. The ends of the pad carrier are jointed to the pad supporting fingers 104 (see Figs. 5, 7, 11 and 12) which are pivoted to the ends of the pad supporting arms 105, the latter being slidably mounted in the wiper support 40. The supporting arms are advanced to clasp the pad about the heel by means of the connected cross bar 106, the latter rigidly secured, as by the stud 107 and pin 108 (Fig. 11), to the sliding actuating bar 109. The actuating bar is connected to be moved by the cam shaft of the machine through suitable connections, such as the spring 110 and lever 111, the latter moved by the plunger rod 112 actuated by a cam (not shown), as is customary in this type of machine. The cross bar 106, being rigidly fixed on the actuator bar 109, the sliding arms are advanced equally and together. Means, however, are provided to cause the arms to turn to one side or the other, if necessary, to permit the pad to conform to the swing of the last. To effect this, the studs 113, which connect the arms to the cross bar, work in slots 114 and each arm 105 fashioned to slide on a guiding block 115, the latter pivoted to turn on the wiper support 40, but secured beneath the same to a rearwardly projecting arm 116, which has an end contacting with the inclined face 117 of a wedge bar 118. The latter is secured to the under face of the cross bar 106 by the stud 107, but is permitted sliding movement lengthwise the bar by provision of the slots 119 and guide rollers 120 (Fig. 12). As the cross bar is advanced, the wedge acts to turn the guiding blocks 115 and swing the supporting ends of both arms 105 inwardly to clasp the ends of the pad about the last. Springs 121, connecting the lower ends of the roller studs and depending pins 122^{x} on the ends of the arms 116, normally tend to keep the wedge central and the band symmetrical relatively to the axis of the head. If the heel band, however, requires to be shifted to meet the swing of the last, the resistance to the advance of the wedge on one side or the other causes it to slide crosswise and turn the guiding blocks unequally to give a differential swing to the supporting arms and automatically adapt the pad to the heel.

After the shoe has been jacked, as previously described, it is usual to provide means such as the elevating rod 122 to press the last up against the wipers. The rod herein is elevated by the foot treadle 123 (Fig. 1) to cause the upper end thereof (Figs. 4 and 5) to engage with the overlying lateral horizontal straight ledge 124 on the elevating wedge 18 and thereby lift the heel post and last. To permit this the wedge 18 is pivoted at 125 to the heel lasting head on the forwardly adjustable support 126, the forward end of the cam being yieldably supported by the preferably light spring 127. The wedge may be adjusted lengthwise the carriage to vary its lifting effect on the heel post by the segmental pinion 125^{x}, meshing with a rack 126^{x} on the under side of the wedge support 126 and controlled (Fig. 6) by the external wedge controlling lever 127^{x}, (Fig. 1). Since the ledge 124 is of sufficient extent to overlie the elevating rod for all positions of the wedge, the rod engages with the latter irrespective of the adjustment of the wedge.

The lifting rod treadle 123 is provided (Figs. 1 and 2) with the pawl 130 cooperating with the ratchet 131 so as to maintain the up-pressure on the last without further exertion on the part of the operator. To provide for the automatic release of this up-pressure coincidentally with the release of the carriage and the dropping of the toe post, there is provided the treadle releasing arm 132 adapted to be moved to release the pawl from the ratchet. The arm is fixed on the rock shaft 133 (Fig. 2) and is given a releasing movement on movement of the carriage-releasing knee lever 27, which latter, when moved to release the carriage, engages with the finger 134 located back of the knee lever and secured to the rock shaft 133. Movement of the knee lever acts to release the carriage (Fig. 4) through the upright rod 135 connected to throw the bell-crank lever 136 pivoted on the frame of the machine. When thrown, the lever 136 causes a roller 137 to strike the latch 21 and free the same from the catch 22, Fig. 6.

The last support when elevated and retracted in the heel lasting head is retained in such condition by the pawl 137^{x} (see Figs. 4 and 6) which engages with ratchet teeth 138 on the inside face of the hand wheel 19. The pawl is carried on the depending lever 139 which is pivoted between ears 140 on the journal for the hand wheel shaft. The pawl

is pressed into engagement by the spring 142 (Fig. 9), but is thrown out of engagement to effect automatic release of the heel band and the lowering of the last support when the roller 143 (Fig. 9) on the lever 139 meets the curved top edge of the cam plate 144 fixed to the side of the trackway 6. To provide for the release of the hand wheel at any time by the operative independent of the carriage position, the pawl carrying lever is prolonged at its lower end and carries the portion 145 adapted to be pressed by the knee of the operative at any time to effect the release of the hand wheel.

Turning now to the toe lasting head, the toe lasting devices are mounted upon the wiper support 146, which is adjustable by means of the hand wheels 14 and 15 in substantially the same fashion as described with reference to the heel lasting head. The wiper plates 12 (Figs. 21 and 27) are supported upon cam carriers 147, and the latter are given a combined advancing and closing-in movement by means of the sliding actuating bar 148 and wiper lever 13 in the usual manner. Means are provided, however, for removably securing each wiper plate to its carrier so that, while rigidly seated thereon, it may be quickly detached for the substitution of a wiper of different shape. Herein (Figs. 27, 28 and 29) the under face of each cam plate 147 is provided with a recessed shoulder 149 and the rear edge of the wiper plate is fashioned to seat against said shoulder and against the flat under side face of the carrier. To removably hold the wiper against its seat, the lateral edge of the wiper is beveled as at 150 (Fig. 28) and is engaged by the underlying beveled lip 151 of the clamping member 152, which latter, being pivoted upon the carrier as at 153, may be swung into or out of engagement with the wiper edge. The clamp also has the shoulder 154 which swings over the shouldered edge 155 of the carrier, and it acts, therefore, not only to seat the wiper in the recessed shoulder 149, but also to force or wedge the wiper against the adjacent flat face of the carrier. When the clamp is swung away from the wiper the latter may readily be withdrawn from its seat. To force and hold the clamp in its clamping position suitable means are provided, such as the pivoted cam lever 156, the suitably fashioned end of which is adapted to engage the lug 157 projecting from the edge of the wiper carrier. The cam lever when drawn to the position shown locks the clamp against the wiper, but movement of its free end outward will act to release the clamp lever.

In the disclosed lasting machine the toe lasting head, like the heel lasting head, is provided with lasting devices supplementary or auxiliary to the wiper plates, and, like the auxiliary heel lasting devices, these are also mounted upon a supplemental head 158 pivoted at 159 to the cap plate 160 overlying the toe wiper cams. The auxiliary lasting devices for the toe head comprise the lasting arms 161 (Figs. 21, 24 and 30), carrying at their free outer ends the work engaging members 162 which, when the head is turned down, are adapted to rest upon the overturned edges of the stock. These members 162 are preferably formed so that when turned into operative position, they will rest at one portion of their length upon the outturned material on top of the wipers, and at another portion press upon the outturned material at the edge of the wiper or even on the insole in front of the wiper edge. The outer longitudinal edge of these auxiliary devices is preferably beveled or cut away, as at 162^x, Figs. 30 and 31, so that as the wipers move in they may readily wedge under the outturned material and auxiliary lasting devices, lifting the latter if necessary. Of course, if desired these auxiliary lasting devices may be formed to rest upon the outturned material above or on top of the wipers throughout their length. The arms are pivoted at 163 to the supplemental head, so that the members 162 are permitted a closing-in movement with the wipers, although normally drawn out against the adjustable stop screws 164 (Fig. 24) by the springs 165 attached each at one end to an arm and at the other end to the head. The work engaging members 162 are removably secured to the ends of the fingers 161 by screws 166 and with interposed shims, so that members of different shapes may be supplied to accommodate different forms of wipers or suit different conditions of use. The work engaging members are herein arranged to increase the frictional hold of the wipers, especially near those advanced portions which work at the side of the toe, without, however, affecting the smooth wiping action of the under or active wiper faces. To this end the under or active faces of the work engaging members 162 are so fashioned or equipped that when depressed against the overturned edge of the stock above the wipers, as represented in Fig. 30, they act to pinch the stock against the wipers and act to increase the draft on the stock by retarding its slippage over the wiper edges as the latter advance and close in. In the illustrated instance the lower edges of the work engaging members are merely roughened, although obviously they may be provided with teeth or faced with leather or other friction material according to the nature of the work and the conditions of use.

The supplemental head is provided with devices to depress and apply the lasting members 162 to the work. These comprehend the sliding cap plate 167 controlled by

the hand lever 168 and constructed substantially the same in this respect as the supplemental carrier in the heel lasting head, so that, when turned down, the hand lever may be moved to cause the cap plate 167 to engage the overlying ears 169 and depress, and hold depressed, the grippers 162 against the stock. The arms 161 are preferably constructed with more or less resiliency so that, when depressed, the work engaging members exert a firm but suitably yielding pressure against the stock.

When the auxiliary toe lasting devices are employed, with the shoe positioned and ready for the wiping operation, the free edge of the stock is reversely laid over the wiper edges, as represented in Fig. 30, and the lasters then depressed to pinch the stock against the wipers. If the wipers are then closed in they stretch and lay the stock over the insole as usual, but with the additional draft imparted by the yielding grip of the overlying work engaging members. As the wipers move in, and the stock slips over the edge of the wipers, the stock as well as the in movement of the wipers, tends to draw the lasting arms in more or less (see Fig. 31) against the opposing pull of the springs 165 by the friction-creating pressure of the lasters against the wipers. With the stock wiped in as described, the lasters may be released by the hand lever 168 and thrown back out of the way to permit retraction of the wipers and the application of the fastening.

In the usual lasting machine employing end wipers it is difficult, particularly at the toe, to avoid a tendency of the stock to slacken and loosen at the sides of the last, as for example, at or adjacent the toe cap seam when the toe is lasted. This is not only due to the fact that the inward draft of the wipers is the least effectual at the sides of the toe and adjacent the advanced portions of the active wiper edges, but also to the fact that, with the wipers advancing as well as closing in, there is an extreme draft rearward and away from the tip, which tends to work the stock from the tip rearward and to loosen it at the sides beyond the range of the wipers. The described construction of auxiliary lasters not only obviates this by increasing the frictional grip of the wipers at their most advanced edges where most needed, but, since the lasting arms 161 are pivoted to the supplemental head and do not advance with the wipers, the work engaging members, while augmenting the inward draft, tend to hold back the stock at the sides of the toe and prevent it from being stretched or drawn away from the tip with and in the direction of wiper advance. It will be obvious that these described features of the invention, while of particular importance in lasting the toe, are not limited in their application to toe lasting devices, but may be employed, if desired, in connection with the lasting devices for the heel.

In conjunction with the toe lasting devices there is preferably employed a hold-down adapted to engage the insole between the wiper plates. Such hold-down is herein pivotally mounted on the usual swinging arm 170 (Figs. 1 and 25) secured to the upright rod 171 and normally swung outward to throw the hold-down away from the last by means of the spiral spring 172. The hold-down arm 173 (Fig. 25) is pivoted to the end of the swinging arm 170 and carries two insole-engaging members 174 suitably shaped to engage the insole between the wipers. The members 174 are each mounted upon a lever arm 175 pivoted at 176 to the arm 173, and normally spread apart by the spring 177 to the position shown in Fig. 25 where the stops 178, on the levers, abut against the arm. This provides means for adjusting the insole engaging portion of the hold-down to apply it to toes of varying widths, for the operative, in applying the hold-down, can grasp the levers 175 and draw the insole-engaging portions toward each other to adapt them to a narrow toe or allow them to spread apart to cover any desired insole area, limited only by the location of the stops 178. In order to provide for an even pressure against the insole by the hold-down, each member 174 is preferably secured to its lever by means which permit relative rocking movement, such, for example, as the spherical seat 179 (Fig. 26), connection being maintained by the rivet 180. This permits the hold-down to adapt itself to insoles of varying curvature and shape due to the variations in the spring of the last, the stop 174ˣ being provided to limit swinging movement of the plates 174 by contact with the arms 175 and maintain the plates in alinement with the shoe. The hold-down, when swung over the last, may be drawn forcibly down against the insole and there locked by the foot treadle 29 suitably shaped to engage the teeth on the holding ratchet 203. The ratchet, however, is mounted to swing away from the foot treadle and release the hold-down when the rod 135, to which it is connected, is elevated. The upper end of the rod is connected to the knee releasing lever 27 (Fig. 4) so as to be raised for the release of the hold-down simultaneously with the release of the heel lasting carriage and the elevating rod 122.

While many features of this invention are not limited to any particular type of lasting machine, the machine herein shown is of the class employing a vertically movable toe lasting head where, as a preliminary step to the closing in movement of the wipers, the stock is first wiped up about the sides

of the toe by the wiper plates or a suitable toe pad, or both. In the present machine there is shown, as a means for effecting the wiping up action, the toe pad 181, Figs. 21 and 23, which, as the lasting head is elevated, is caused to wipe up the leather about the last and also there to retain it when the wiping plates subsequently advance to break it down over the insole. The pad 181 comprises a facing preferably of leather or other suitable friction material removably secured as a facing for the flexible sprocket 182. To readily remove the pad for the substitution of differently shaped ones, the ends of the pad (Figs. 22 and 23) are provided with U-shaped clips or brackets 183 which, with the pad as positioned, may be slid longitudinally into a slot 184 in the attachment 185. The bottom of the clip enters the slot, while the side thereof lies against the side of the attachment, acting thereby rigidly to support the ends of the pad. The center of the pad is supported by an underlying segmental shelf or bracket 186 projecting from the sprocket 182 under the rear portion of the pad and provided with a spring-pressed latching pin 187, which, with the pad positioned, may be snapped into an opening in the metal clip 188 secured to the bottom of the pad. By merely withdrawing the pin 187 the pad may be withdrawn longitudinally for the the substitution of another. The attachments 185 at the outer ends of the pad are supported, as are also the ends of the sprocket (see Fig. 24), by pivoted supporting fingers 189 and sliding supporting arms 190 (Fig. 24) which connections, together with the cross bar 191, Fig. 21, and the equalizing wedge 192, may be and preferably are of substantially the same construction as the supporting devices for the heel lasting pad. The toe pad, however, is adapted to be clasped about the toe for the wiping up action by means of the pad clasping lever 193 (Figs. 1 and 21), which is pivoted on the wiper support 146 and jointed to the pad actuating bar 194 (Fig. 21), so that, by movement of the lever, the ends of the pad may be clasped about the toe of the last. The pad clasping lever is provided with a hand latch 195 which controls a pawl 196 adapted to engage with the fixed ratchet 197, so that the pad, when closed in to any given position, may be there retained. In order to adjustably advance the pad, the center of the pad carrier is supported upon the rearwardly extending rack bar 198, which latter is provided with teeth meshing with the pinion 199 connected (Figs. 21 and 24) to be turned by the hand lever 200 at the side of the toe lasting head. The lever is provided with a spring-pressed latching pin 201 engaging the teeth of a ratchet plate 202, so that the lever may be turned and held by its pawl in any desired position, thereby advancing or retracting the pad.

Provision is made for raising and lowering the toe lasting head by means of the foot treadle 203 (Figs. 1 and 3), which latter is connected to rock the transverse elevating shaft 204 and raise the rod 205. The latter is connected at its lower end by an arm to the rock shaft and at its upper end to a sliding head 206 which is mounted to slide in vertical ways 207 and connected to the lasting head support 2.

In the operation of the machine the toe lasting head, having been properly positioned with reference to the toe of the shoe to be lasted, and with the wipers below the level of the insole, the toe pad 181 is tightly clasped about the sides of the toe and there locked by the pad lever 193. The wiper plates are then moved in by the wiper lever 13 to bear against the sides of the toe, and the auxiliary work engaging members 162 are applied to the stock and depressed, as previously described. The entire toe head is then elevated by pressure on the foot treadle 203, the friction of the toe pad acting to wipe up and stretch the stock about the sides of the toe. The operative, holding the wiper lever to press the wipers inward, causes the wipers to close in as soon as he feels them rise above the edge of the insole and thereby wipes the leather in over the insole. As the wipers are closed, foot pressure is shifted from the elevating treadle 203 to the depressing treadle 206 so as to press the in-closing wipers down against the stock. With the toe pad still clasped, thereby preventing slackening of the leather, the wipers may be retracted for the application of the fastening, after which the pad may be unclasped and the lasted shoe unjacked, as previously described. The action of the wipers, as described, often tends to leave the stock somewhat rounded over the shouldered edge of the insole. In order to lay the stock perfectly flat in the shouldered edge (see Figs. 30 and 31) the wipers are preferably closed in again over the insole shoulder after the stock has been fastened and a heavy downward pressure applied to crease the leather over the edge of the insole and flatten it into the shoulder thereof. For this purpose, prior to the unjacking of the shoe, but after the application of the fastening and the unclasping of the toe pad, the wipers are again closed in and forcibly depressed against the fastened stock. While this can be accomplished to some extent by means of the depressing treadle 206, to make this step sufficiently effective there is herein employed additional depressing means of greater leverage and adapted to exert a greatly augmented downward pressure on the head. Such means are herein comprehended in the manually movable depressing lever 209

loosely mounted in the rock shaft 204 and normally held in the position shown against the stop 211 by the spring 210. The rock shaft, however, has fixedly secured thereto the segmental ratchet 212, and, when it is desired to depress the head with the increased power required to flatten the stock, the operative, by grasping the lever handle 213, can move the adjacent hand latch 214 and, by the link connection shown, apply the pawl 215 to the ratchet to lock the lever to the rock shaft and turn the latter to depress the lasting head.

As previously stated, many of the features herein described are applicable to lasting machines of other types than the one herein shown. It is also to be understood that, while the various features of the invention have, for illustrative purposes, been shown embodied in a concrete machine, the invention is not limited either to the machine shown, or to the details of construction or the form or relative arrangement of parts, but that extensive deviations may be made therefrom without departing from the spirit of the invention.

What is claimed is:

1. In a lasting machine, the combination of a last support, end wipers, auxiliary lasting devices movable into operative position for engaging the work in front of the wipers, and means for guiding the auxiliary lasting devices into engagement with the work as they are moved into operative position.

2. In a lasting machine, the combination of a last support, end wipers, side auxiliary lasting devices for engaging the work in front of the wipers, means for adjusting a wiper toward and from the center of the last and for correspondingly adjusting the associated auxiliary lasting device.

3. In a lasting machine, the combination of a last support, wiper carriers, end wipers associated therewith, side grippers for positively engaging the work in front of the wipers, means for adjusting a wiper with relation to its carrier and for correspondingly adjusting the associated gripper.

4. In a lasting machine, the combination of a last support, end wipers, side grippers and end grippers to positively engage the work in advance of the wiper edges, and means for causing closing and opening movements of the wipers and side and end grippers over the shoe sole.

5. In a bed lasting machine, the combination of a last support, end wipers, side grippers and end grippers to engage the work in advance of the wiper edges, and means to move said grippers inwardly over a shoe sole simultaneously with and immediately in advance of the acting edges of said wipers.

6. In a lasting machine, the combination of a last support, end wipers, grippers for positively engaging the work in front of the wipers, arms carrying said grippers, means for adjusting the grippers on said arms and means for moving the wipers and grippers over the sole of a shoe sustained by said support.

7. In a lasting machine, the combination of a last support, end wipers, grippers having teeth for positively engaging the work in front of the wipers, and means to adjust the grippers to regulate the penetration of said teeth.

8. In a lasting machine, the combination of a last support, wiper carriers, end wipers associated therewith, side grippers for positively engaging the work in front of the wipers, a gripper carrier for swinging the grippers into and out of operative position, means for adjusting an end wiper with respect to its carrier toward and from the center of the last, and means controlled by said adjusting means to correspondingly adjust the associated gripper when said grippers are moved into operative position.

9. In a lasting machine, a last support, end wipers, side grippers and a plurality of end grippers to engage the outside of the work and movable with and in front of the wipers in their closing or wiping movements.

10. In a lasting machine, the combination of a last support, end wipers, grippers for positively engaging the work on the same side as and in front of the wipers, said wipers and grippers constituting lasting devices, and means associated with the grippers to engage the insole and level it with respect to the lasting devices.

11. In a lasting machine, the combination of a last support, end wipers, a gripper carrier and grippers mounted thereon, and adapted to engage the work in front of the wipers, said wipers and grippers constituting lasting devices, and adjustable means carried by the gripper carrier to engage the insole of a shoe sustained on said support and position it with respect to the lasting devices.

12. In a lasting machine, the combination of a last support, end wipers, a gripper carrier having grippers and a foot mounted thereon to swing together toward and from the last support said grippers engaging the work in front of the wipers, said foot engaging the insole between the grippers, and means to force said foot downward to position the work after the grippers and foot have been swung into operative relation therewith.

13. In a bed lasting machine, the combination with wiper carriers, means to impart a combined advancing and closing movement to the carriers, of wiper plates supported by the wiper carriers, a locking pin mounted to swing on each end wiper carrier and engaging a wiper plate for adjusting the plate on

the carrier relative to the line of advance and a handle for swinging each locking pin.

14. In a bed lasting machine, the combination with wiper carriers, means to impart a combined advancing and closing movement thereto, wiper plates carried by said wiper carriers, a locking pin mounted to swing on each wiper carrier and engaging a wiper plate for adjusting the plate on the carrier about a center substantially co-incident with the center of opening and closing movement of the wiper carriers, and a handle for operating each locking pin.

15. In a bed lasting machine, the combination with wiper carriers, of wiper plates thereon, means for locating said plates on said carriers comprising slots curved from a center coincident with the center of opening and closing movement of the wiper plates, and slot engaging pins by which the plates have sliding adjustment upon the carriers, and means for adjustably holding the said plates by said locating means.

16. In a lasting machine, the combination with a wiper carrier, of a wiper plate removably secured thereto, and a clamping member having a recessed edge to engage the adjacent edge of the wiper plate to removably hold the plate on the carrier.

17. A lasting machine having a wiper carrier, a wiper removably connected thereto, and a clamp for engaging the exterior edge portion of the wiper for retaining it on the carrier, said clamp and wiper having correspondingly beveled engaging edge portions.

18. In a lasting machine, the combination of a heel lasting carriage, a last support, an inclined rest for said support and having a longitudinally extending flange, means for causing relative longitudinal movement between the inclined rest and last support, and an elevating rod adapted to engage said longitudinally extending flange.

19. In a lasting machine, the combination of a heel lasting carriage, a last support, an inclined rest for said support and having a longitudinally extending flange, means for causing relative longitudinal movement between the inclined rest and last support, an elevating rod adapted to engage said longitudinally extending flange, and ratchet and pawl means for locking the elevating rod.

20. In a lasting machine, the combination of a last support, end wipers, means for operating the wipers, and separate means disposed one at each side of the last support for pressing the work against the end wipers to increase the effective wiping action of the wipers as they pass beneath said means.

21. In a lasting machine, the combination of a last support, end wipers, means for operating the wipers, and yielding means comprising auxiliary lasting members, one cooperating with each end wiper at opposite sides of the last support for pressing the work against the end wipers to increase the effective wiping action of the wipers as they pass beneath said means.

22. In a lasting machine, the combination of a last support, end wipers, means for operating the wipers, and auxiliary lasting members one for each wiper for pressing the work against the end wipers to increase the effective wiping action of the wipers as they pass beneath said means, said auxiliary lasting members having a beveled or sloping edge to permit the wipers to wedge beneath the auxiliary lasting devices as they move inward.

23. In a lasting machine, the combination of a last support, end wipers, means for operating said wipers, and auxiliary side lasting devices, one for each end wiper, said auxiliary lasting devices having friction engaging faces to engage the material of the upper and hold it against the end wipers, and means to permit movement of the auxiliary lasting devices with the respective end wipers as they move inward.

24. In a lasting machine, the combination of a last support, end wipers, means for operating said end wipers, separate and independently movable auxiliary lasting members coöperating with said wipers at the side of the shoe to hold the material against said wipers, and means permitting the auxiliary lasting devices to be adjusted to aline with the shoe.

25. In a lasting machine, the combination of a last support, end wipers, means for operating the end wipers, separate auxiliary lasting members coöperating with each of said wipers at the side portions of the shoe to hold the material against said wipers as they move inward, and supporting means for said auxiliary lasting members to permit them to be moved independently by the end wipers during the wiping action.

26. In a lasting machine, the combination of a last support, side wiping means for wiping the upper material of a shoe inward, separate auxiliary lasting members for said wiping means to hold the material against the wiping means during the wiping action, and a head carrying said separate auxiliary lasting members and mounted to swing said auxiliary lasting members into and out of operative position with respect to the wiping means.

27. In a lasting machine, the combination of a last support, wiping means for wiping the upper material of a shoe inward, auxiliary lasting members mounted to contact with the upper material and hold the same against the wiping means, and means for adjusting the auxiliary lasting devices toward and from the center of the shoe sole sustained by said last support.

28. In a lasting machine, the combination of last supporting means, wiping means for

wiping the upper material of a shoe inward, independently movable auxiliary lasting members, arms carrying said members, and means for independently adjusting the arms to move said members relatively inward.

29. In a lasting machine, the combination of a last support, end wipers, and a hold down comprising pivotally mounted bearing arms each carrying an insole engaging member, and means normally acting to separate said members.

30. In a lasting machine, the combination of a last support, end wipers and a hold down comprising bearing arms each carrying an insole engaging member loosely mounted thereon, and means normally acting to separate said members.

31. In a lasting machine, the combination of a swinging arm, a hold down arm jointed thereto and carrying bearing arms, and a loosely sustained sole engaging member carried by each of said bearing arms.

32. In a lasting machine, the combination of a swinging arm, a hold down arm jointed thereto and carrying bearing arms, and a sole engaging member carried by each of said bearing arms, said sole engaging members being conformable to the sole of the shoe being lasted.

33. In a lasting machine, the combination of last supporting means, wiper means, a hold down arm carrying bearing arms, a sole engaging member carried by each of said bearing arms, and adapted to swing with relation thereto, and stops to maintain said members in alinement with the general longitudinal direction of a shoe sole sustained by the supporting means.

34. In a lasting machine, the combination of a last support, end wipers, a flexible member adapted to conform to the shape of the shoe at the end thereof, a facing pad for said flexible member, supporting fingers for said flexible member and pad, depending supports carried by the supporting fingers, and means connected to the pad for detachably engaging said supports.

35. In a lasting machine, the combination of a last support, wiping means for wiping the upper material of a shoe inward, a pad for engaging the end portion of a shoe sustained by said support, means for moving the wipers and pad upward about the shoe in drawing the upper to the last, and manually controlled means for bodily adjusting the position of said pad with relation to the wiping means in a direction longitudinally of the shoe to adjust the same for different lengths thereof.

36. In a lasting machine, the combination of last supporting means, wiping means for wiping the upper material of a shoe inward, a flexibly sustained pad for engaging the end portion of a shoe sustained by said support, means for moving the pad upward about the shoe in drawing the upper to the last, a bar for centrally supporting said pad, and means for adjusting said central supporting bar in a direction longitudinally of a shoe sustained by said supporting means to position the pad longitudinally for different lengths of shoes.

37. In a lasting machine, the combination of last supporting means, wiping means for wiping the upper material of a shoe inward, a flexibly sustained pad for engaging and conforming to the end portion of a shoe sustained by said support, a rack bar for supporting said pad, a pinion engaging the rack bar, and hand operated means for operating the pinion to position the pad longitudinally with relation to the wiping means for different lengths of shoes.

38. In a bed lasting machine, the combination with a heel lasting head, and last supporting means, of heel lasting wipers and auxiliary lasting devices or grippers on said head, and means for adjusting the wipers and grippers on the head for use with rights or lefts.

39. In a bed lasting machine, the combination with wiper carriers, wiper plates, means for locating the plates upon the carriers, comprising inter-engaged curved wall portions through which the plates have sliding adjustment upon the carriers, and means for moving and for holding each plate in its selected position of adjustment, comprising a coöperating slot and locking pin, one upon the plate and the other upon the carrier.

40. In a lasting machine, the combination with a last support, a pair of wipers and coöperating grippers, means to advance and close the same, and means to adjust one wiper with relation to the other to start its closing movement near the center line of advance, and means to correspondingly determine the path of the gripper movement.

41. In a lasting machine, a heel lasting head having end wipers, means to cause the said wipers to advance and close in, and means to exert an inward draft on the stock at the fore-portions of the heel while the wipers are advanced.

42. A lasting machine having a last support, end wipers, and positive work-engaging means for the heel, positive work-engaging means for the side, and means to advance the heel engaging means relatively to the side engaging means.

43. A lasting machine having a lasting head, wiping means, pivoted work-engaging devices mounted on the lasting head, means to advance the wiping means relatively to the work-engaging devices and simultaneously to cause movement of the latter about the pivots on the lasting head.

44. A lasting machine having wiping means, positive work-engaging means, and projecting devices on the wiping means to

cause closing-in movement of the work-engaging means.

43. A lasting machine having wiping means, work-engaging means adapted to be moved simultaneously with said wiping means, and means for adjusting the work-engaging means for rights or lefts.

46. In a lasting machine, a shoe support, end wipers, a pad having pivoted end supports, slidable members carrying said end supports, and means both to advance and differentially swing said slidable members.

47. In a lasting machine, a shoe support, end wipers, a pad having pivoted end supports, supporting means for said end supports mounted for movement toward and from said pad, and means to differentially move said supporting means toward or from the pad.

48. In a lasting machine, shoe supporting means, end wipers, a pad having end supports for the same, and wedge equalizing means for differentially moving said supports.

49. In a lasting machine, shoe supporting means, end wipers, a pad, pivoted end supports, means to advance said supports, and means also to move said supports with their pivots yieldingly and differentially toward or away from the pad.

50. In a lasting machine, shoe supporting means, end wipers, a pad, slide bars for supporting the end of the pad, means to advance said slide bars, and means automatically conformable to the shape of the last to swing said slide bars toward or away from the pad.

51. In a lasting machine, shoe supporting means, end wipers, a hold down, means to exert a pressure on the last toward the wipers, means to release the hold down, and means simultaneously to relieve the pressure on the last.

52. In a lasting machine, a longitudinally movable lasting head, a hand wheel on the head for positioning the last, a ratchet and pawl for locking the hand wheel, a depending pawl releasing lever, and a cam on the machine frame for actuating the releasing lever.

53. In a lasting machine, the combination with a last support and end wiping means to wipe the upper material inward, of means independently movable with and by each of the wipers to increase the frictional hold thereof upon the stock during the wiping action.

54. In a lasting machine, the combination with wiping means at each side of the shoe end portion, of pivoted and independently movable work-engaging means coacting with the wiping means at each side of the shoe to pinch the stock against the wiping means, said work engaging means being movable with and by the wiping means.

55. In a lasting machine, the combination with a pad, of pad supporting means having means for supporting the pad thereon while permitting free longitudinal withdrawal of the pad.

56. In a lasting machine, the combination with a toe lasting head, of a toe pad, toe lasting wipers, and means for longitudinally adjusting the toe pad independently of the wipers.

57. In a lasting machine, the combination of a last support, end wipers to wipe the upper material inward, auxiliary lasting devices, carriers for said devices on which said devices are adjustably mounted, and means to permit the said devices to engage the upper material in front of the wipers and be moved inward by the wiper movement.

58. In a lasting machine, the combination of a last support, end wipers, levers for adjusting the end wipers, auxiliary lasting devices, means connected to said levers for positioning the auxiliary lasting devices as they are moved into operative position, and means to move the wipers and auxiliary lasting devices inward.

59. In a bed lasting machine, the combination of a last support, end wipers to wipe the upper material inward, grippers extending forward and beyond the wipers, pivotally mounted arms carrying said grippers, and means for moving the wipers and grippers inward.

60. In a lasting machine, the combination of a lasting carriage, a wiper carrying support, a saddle or intermediate support pivotally connecting the lasting carriage and wiper carrying support, segmental guides sustained by said saddle or intermediate support, complemental portions connected to the wiper carrying support and engaging said segmental guides, a sliding rack block having operative engagement with the wiper carrying support, and means for sliding said block.

61. In a lasting machine, a shoe support, a head, wipers on said head for acting at each side of the end of the shoe to lay the upper over the sole, a pad carried by the head and having pivoted end supports, slidable members carrying said end supports, means to advance and swing said end supports, separate means for operating the wipers, and means for raising the head while the pad is in contact with the shoe.

62. In a bed lasting machine, the combination of a head, end wiper plates carried by the head, a flexible pad also carried by the head, independent hand levers for operating the wiper plates and closing the pad about the end of a shoe, means for tilting the head longitudinally and transversely to properly position the wiper plates and pad with respect to the bottom surface of the last, and means for raising the head bodily and with

it the pad and wipers when the pad is closed against the end of the shoe and for bodily lowering the head.

63. In a bed lasting machine, the combination of a base, a lasting carriage thereon, a wiper carrying support carrying wiper plates, shoe supporting means, a saddle pivotally connecting the lasting carriage and wiper carrying support, and an interlocking arc-shaped rib and groove connection located between the lasting carriage and wiper carrying support to permit lateral rocking movement of the wiper carrying support and direct that movement about an axis extending lengthwise of the shoe and located substantially in the plane of the bottom face thereof, one member of said interlocking arc-shaped rib and groove connection being mounted on the pivotally supported saddle which connects the lasting carriage and wiper carrying support, and the other on the wiper carrying support.

64. In a bed lasting machine, the combination of a base, a lasting carriage thereon, a wiper carrying support carrying wiper plates, shoe supporting means, a saddle pivotally connecting the lasting carriage and wiper carrying support, an interlocking arc-shaped rib and groove connection located between the lasting carriage and wiper carrying support to permit lateral rocking movement of the wiper carrying support and direct that movement about an axis extending lengthwise of the shoe and located substantially in the plane of the bottom face thereof, one member of said interlocking arc-shaped rib and groove connection being mounted on the pivotally supported saddle which connects the lasting carriage and wiper carrying support, and the other on the wiper carrying support, and an adjusting device carried by the saddle for tilting the wiper carrying support.

65. In a bed lasting machine, the combination of a base, a lasting carriage thereon, a wiper carrying support carrying wiper plates, shoe supporting means, a saddle pivotally connecting the lasting carriage and wiper carrying support, and an interlocking arc-shaped rib and groove connection located between the lasting carriage and wiper carrying support to permit lateral rocking movement of the wiper carrying support and direct that movement about an axis extending lengthwise of the shoe and located substantially in the plane of the bottom face thereof, one of said interlocking connections being disposed adjacent the pivotal point of the saddle and the other near the other end of the saddle, and one member of each of said interlocking connections being mounted on the saddle and the other on the wiper carrying support.

66. In a bed lasting machine, the combination of a lasting head carrying end wipers and a pad, treadle means for raising the head to cause the wipers to lay the upper about the end of the last and to lower the head to cause the wipers to act close to the plane of the bottom of the last in laying the edge of the upper over the last, and additional means to powerfully depress the head while the wipers are over the bottom of the last to lay the stock flat.

67. In a bed lasting machine, the combination of a lasting head carrying end wipers and a pad, treadle means for raising the head to cause the wipers to lay the upper about the end of the last and to lower the head to cause the wipers to act close to the plane of the bottom of the last in laying the edge of the upper over the last, and a hand lever additional thereto for powerfully depressing the wipers onto the bottom of the last.

68. In a bed lasting machine, the combination of a toe lasting head, toe wipers carried by said head to wipe the upper over the toe end of the last, means for bodily raising and lowering the head to position the wipers with respect to the bottom of the last that they may properly wipe the upper thereover, and additional means for depressing the wipers onto the bottom of the last after the wiping action.

69. In a bed lasting machine, the combination of a toe lasting head, toe wipers carried by said head to wipe the upper over the toe end of the last, means for tilting the head to bring the wipers substantially into the plane of the last bottom, means for bodily raising and lowering the head to position the wipers with respect to the bottom of the last that they may properly wipe the upper thereover, and additional means for depressing the wipers onto the bottom of the last after the wiping action.

70. In a bed lasting machine, the combination of a toe lasting head, toe wipers carried by said head to wipe the upper over the toe end of the last, a treadle, connections between the treadle and head for raising and lowering the head to position the wipers for the wiping action, and a hand lever for giving an additional depression to the head to lay the stock upon the insole and crease the upper over the edge of the insole.

71. In a bed lasting machine, the combination of a vertically movable wiper carrying member, means for raising the member, and other means for depressing said member, said other means being adapted for the application of greater force than the first named means.

72. In a bed lasting machine, the combination of wipers for acting at the end portions of a shoe to wipe the upper over the insole, wiper depressing means adapted to be actuated simultaneously with the closing-in movement of the wipers, and other wiper

depressing means of augmented force to cause the wipers to act upon the stock after the application of the fastenings.

73. In a bed lasting machine, the combination of wipers to act upon the end portion of a shoe and wipe the upper over the insole, foot lever elevating and depressing means for the wipers, and means other than the foot lever means for depressing the wipers with augmented force.

74. In a bed lasting machine, the combination, with a movable lasting head, of means for positioning it for the lasting operation, a last support thereon, last positioning and heel band clasping means adapted to be locked for the lasting operation, means automatically to release said positioning and clasping means as the head returns from lasting position, and means also to effect release of the clasping means independent of the position of the head.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

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M. BROCK.

LASTING MECHANISM.

APPLICATION FILED MAR. 19, 1910.

1,002,818.

Patented Sept. 12, 1911

2 SHEETS—SHEET 1.

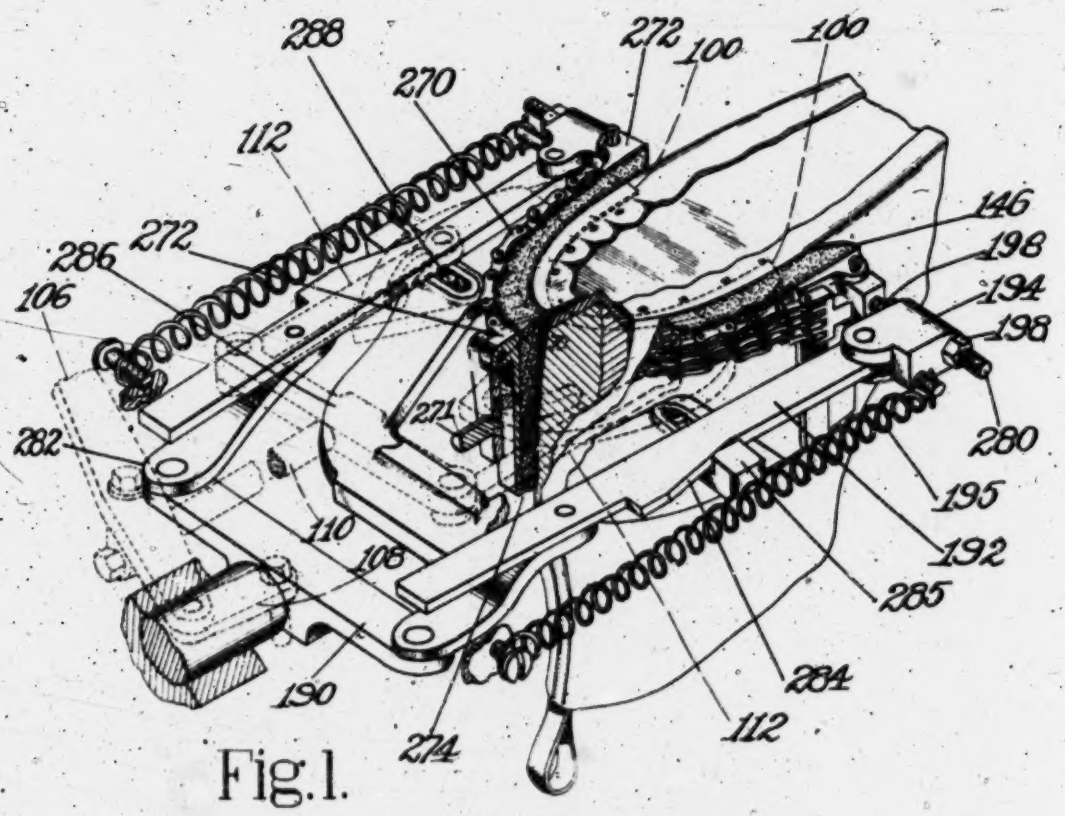


Fig. 1.

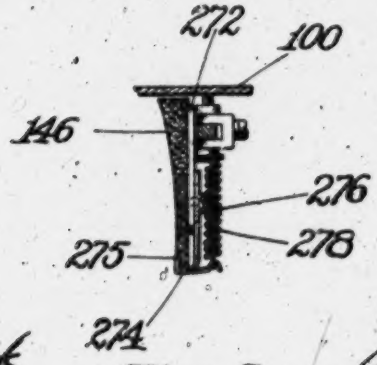


Fig. 2.

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LASTING MECHANISM.

APPLICATION FILED MAR. 10, 1910.

1,002,818.

Patented Sept. 12, 1911.

2 SHEETS—SHEET 2.

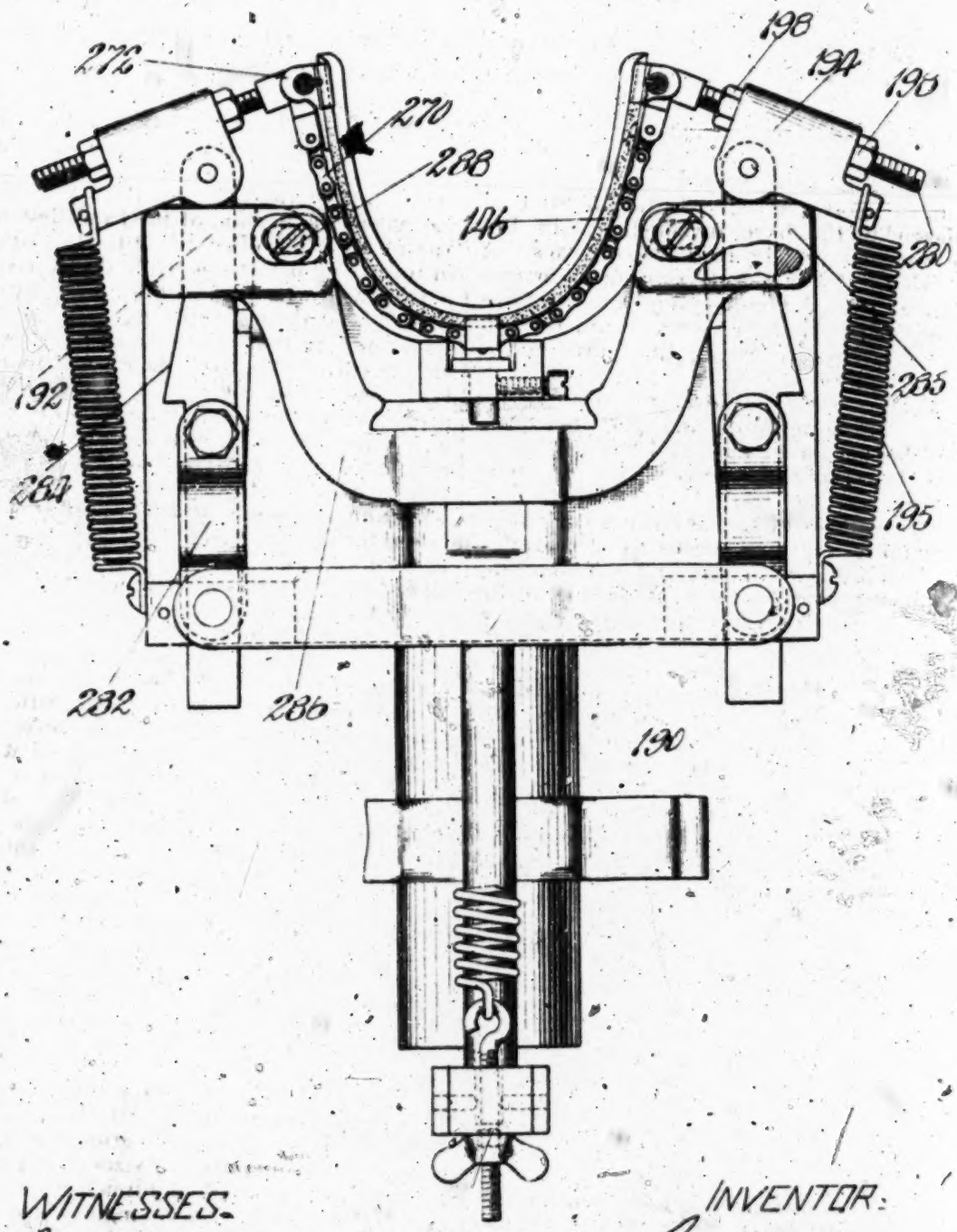


Fig. 3.

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UNITED STATES PATENT OFFICE.

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LASTING MECHANISM.

1,002,818. Specification of Letters Patent. Patented Sept. 12, 1911.

Application filed March 19, 1910. Serial No. 550,434.

To all whom it may concern:

Be it known that I, MATTHIAS BROCK, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Lasting Mechanisms, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for use in forming shoes and particularly to heel lasting mechanism, and has for its object to provide improved heel clamping means.

One feature of this invention consists in providing improved means for actuating a heel embracing band to cause it to clamp with equal pressure the opposite sides of the heel portions of shoes upon right and left lasts which are laterally unsymmetrical.

As is well known, many lasts in use at the present time are fuller at the outer side of the heel portion, which corresponds with the outer side of the foot, than they are at the inner side of the heel portion, particularly at that part of the last which merges into the shank of the last. Any adjustment of the heel-band-closing mechanism which is arranged to cause it to close farther on one side than on the other for one last is, of course, wrong for the other one of a pair of lasts. In accordance with the present invention, therefore, means is provided for equalizing the pressure of the band-closing mechanism at the two sides of the last. This means may advantageously be arranged to permit the band-closing mechanism to adjust the two end portions of the band relatively in accordance with the shape of the last before the final pressure for clamping the upper against the sides of the last is applied.

In the embodiment of the invention herein shown, the band is closed by endwise movable slide bars having inclines on their outer faces. These inclines coöperate with abutments which cause the slide bars to move inwardly and force the end portions of the band against the sides of the last as said bars advance.

In accordance with a preferred embodiment of this invention the abutments at the two sides are connected for movement laterally together to position the slide bars automatically as the band closes against the fuller side of the last. In this positioning movement the portion of the band first contacting with the fuller side of the last pauses in its closing movement while the other end portion of the band is forced up into similar contact with the less full side of the last and thereafter the two end portions of the band are caused to clamp the shoe equally at the two sides of the heel. The two abutments are shown as formed upon the opposite ends of a transverse bar which is guided by pins and slots and has free movement transversely of the last.

A movable connection is employed between the ends of the band and the adjacent ends of the slide bars in order to permit the slide bars to continue their advance movement for closing the end portions of the band against the shoe after the advance movement of the band has been stopped by its engagement with the heel end of the last. A convenient form of movable connection for this purpose includes an angle lever fulcrumed on a slide bar and connected at one end to the band while its other end is connected by a spring to a fixed part of the machine. With this arrangement the end portion of the band is forced inwardly by the turning of the angle lever. The spring returns the parts to normal position when the slide bars are retracted.

A novel feature of this mechanism consists in the provision of an adjustable angle lever formed to permit the lateral position of the end portion of the band with relation to the slide bars to be varied for shoes of different sizes.

It has heretofore been necessary to equip a heel lasting mechanism with three pairs of angle levers of different lengths to adapt the machine for the groups of sizes comprised in men's, women's and children's shoes. By the present invention a single angle lever can be adjusted to support the band in proper position for all the different widths of shoes. The construction employed comprises an angle block, having the usual fulcrum point and the outer spring-engaged arm of the lever, and an arm which is adjustable lengthwise in said block for connection with the band. This adjustable arm

is herein shown as a screw threaded rod which is secured in adjusted position in the angle block by suitable lock nuts.

Further features of this invention are found in the means for supporting and actuating the heel band and particularly in means for sustaining the band adjustably or yieldingly in relation to the lower face of the heel wipers which bend the upper over the edge of the last and form it down upon the heel seat. By this feature of the invention provision is made for locating the band in close proximity to or in contact with the wipers so that the band and wipers coöperate to form the adjacent surfaces into a desirable angular edge. The band may be so sustained by means including either a yielding element or by relatively adjustable members. Preferably the lower member will include a hook to extend under the lower edge of the band and, it may be, upwardly along the inner side of the band a short distance. In the latter event the band may be recessed to receive the tip of the hook. This mounting permits the ready removal of the band without disconnecting any of the parts, and allows the heel band to follow the shoe in any upward movement of the last, such for example as the usual lifting movement to compress the overwiped upper between the last bottom and the lower face of the wipers.

It may be here noted that while this invention is shown as embodied in heel lasting mechanism including a heel band it may equally well be applied to a toe lasting mechanism in which the corresponding end embracing member is usually called a toe pad.

These and other features of the invention, including certain combinations of parts and more important details will be explained in connection with the following description and then be pointed out in the claims.

Figure 1 is a perspective view of so much of the heel lasting mechanism embodying this invention as is necessary for illustrating this invention; Fig. 2 is a vertical section of Fig. 1; Fig. 3 is a plan view of the portions of the machine shown in Fig. 1.

The heel lasting mechanism includes wipers 100 suitably supported and guided to advance and close over the heel seat of the shoe when pressed forwardly by actuating devices which include the links 112, rod 110 and lever 106 which is fulcrumed at its end on the link 108. These parts are shown in dotted lines in Fig. 1 to permit a fuller view of the underlying heel band and its operating mechanism. The heel band 146 is supported and actuated by a chain 270. Certain links or plates 272, which form links of the chain or are connected with the chain and which are shown as located at the rear center and at the two ends, have depending arms which carry inturned band supporting fingers 274. These fingers may have upturned tips as at 275 if desired to enable them to embrace the lower edge of the band, or these tips may be omitted and reliance placed upon the tendency of the band toward expansion to cause it to remain supported on the fingers 274, see Figs. 1 and 2. These fingers may be adjustably connected with the links 272 as by a screw and slot as at 276 to take up wear caused by the movement of the lasting wipers over the upper edge of the band. If desired the screw may remain loose and a spring 278 be employed which will maintain the band constantly raised snugly against the lower face of the heel seat wipers and insure a coöperation between said band and the wipers to form the shoe stock at the angular edge of the heel seat.

The front end plates 272 of the chain are connected to laterally extending arms or angle levers 194 which are fulcrumed upon endwise movable slide bars 192 supported by the bracket 286. These levers each have an adjustable connection with the chain 270 formed by a screw threaded rod 280 which is pivoted to the plate 272 at its inner end and secured in adjusted position in the lever by lock nuts 198. By this arrangement the ends of the heel band can if desired be separately adjusted for right and left lasts to clamp either last as firmly against the concave innerside of the last as against the relatively full outer side of the last, and also the band may be adjusted to open more or less widely for shoes of different groups of sizes as men's, women's and children's. The provision of this adjustable connection saves the necessity for providing angle levers of different lengths for these groups of sizes.

The closing of the band is effected by power transmitted from a plunger 188 and its rigidly attached crosshead 190 to the longitudinally movable slide bars 192 through the swinging links which are pivoted to the said slide bars and to the cross head. This forward movement of the slide bars advances the band as a whole until the band is stopped by firm contact with the heel end of the shoe. The continued advance of the bars then compels the levers 194 to turn against the pull of springs 195 which maintain a snug forward tension on the two ends of the band. During this forward movement of the slide bars 192 they are actuated inwardly to close the band against the sides of the shoe, by coöperating wedge faces 284 on the bars and non-separable lugs 285 with which the wedges have sliding engagement. In this embodiment of the invention these lugs are formed upon the horizontally arranged U-shaped bracket or plate 286 which is supported for right line movement transversely of the machine and is guided in such movement by pins 288 that rise from a

fixed portion of the machine head over which the plate 286 is movable and these pins stand in slots formed in the arms of the plate near the lugs 285. This arrangement of the lugs on the movable plate 286 permits lateral movement of the lugs together and a transverse shifting of the bars in company and effects an equalization of the inward pressure of the band at its two ends. This insures that the band shall clamp the upper against the hollow inner side of the last with the same force as it is clamped against the relatively full outer side of the last. This equalization of the pressure at the two sides, in the region of the ends of the heel stiffener, is of great importance in securing good lasting, especially on such crooked and irregular lasts as many of those now in use.

As advised, it is new by this invention to provide, for advancing and closing of the ends of the heel or toe band, a mechanism which includes coöperating devices one of which, as the slide bars 192, has cam faces to effect closing of the band ends and one of which, as the plate 286 and its abutments 285, is mounted for self adjustment transversely of the machine to equalize the band closing pressure at the two sides of the shoe. It is to be noted that the equalizer, which is the plate 286, is independent in this embodiment of the invention from the means which produces the advance movement of the band.

In the use of the invention a shoe is properly supported vertically and the last and the heel band are relatively actuated longitudinally and laterally, during which movement the heel is thrust against the middle portion of the band and the ends of the band are closed snugly against the sides of the shoe. This latter actuation is effected by the forward movement of the crosshead 190 which moves longitudinally toward the right in Fig. 1 the bars 192 which support the levers 194 which in turn support the front ends of the band. The coöperating wedge faces of the relatively advancing members 284 and 285, which are formed respectively on the slide bars 192 and the equalizer 286, swing or turn the slide bars 192 toward the center of the machine and move the band supporting levers 194 bodily inwardly toward the shoe to clamp the ends of the band against the sides of the shoe. If the shoe is less full on one side at the end of the band than on the other side the equalizer 286 moves freely from the less full side to the larger side and thus provides equal pressure on both sides. The rear end of the band is supported by the stem 271 in the head of the machine which constitutes the carrier upon which all the described parts are movable. Of course it is immaterial whether the inclined faces 284 are formed on the bars 192 or on the studs of the part 286 for the effect is the same in either case when these parts are relatively moved longitudinally of the shoe.

If it is desired to adjust the band for shoes of different widths this is effected by manipulating the nuts 198, 198 and screw 280 on the levers 194 in an obvious way. If the band is to be removed the fingers 274 are sprung downwardly against the springs 278 or are moved after loosening the binding screws if the screws have been tightened, and the band can then be readily pulled out of its holders. When restored it is pressed close up against the under face of the wipers.

Having explained the nature of this invention and described a preferred embodiment thereof I claim as new and desire to secure by Letters Patent of the United States:—

1. A heel lasting mechanism having, in combination, a heel embracing band, means for tensioning the band forwardly, and means for closing the band, said closing means including a member which is mounted for right line movement transversely of the machine for equalizing the closing pressure at the two ends of the band.

2. A heel lasting mechanism having, in combination, a heel embracing band and actuating mechanism therefor, comprising endwise movable slide bars, having oppositely arranged wedge faces, abutments to be engaged by said faces to move the bars laterally as they are advanced, and a connection between the abutments arranged to permit them to move laterally together to equalize the band closing pressure applied by said bars.

3. In a lasting machine, the combination with a heel band, of slide bars, connected with the end portions of the band, inclines on said slide bars, abutments coöperating with the inclines to force the slide bars inwardly as they are advanced, and means permitting the abutments to move laterally together to equalize the lateral pressure of the slide bars and band against shoes of laterally unsymmetrical formation.

4. A heel lasting mechanism having, in combination, a heel band, means for closing the band by a movement of the closing means lengthwise of the shoe, and guiding devices for the closing means at the two sides of the shoe, said guiding devices being connected transversely of the shoe to move in company to equalize the closing pressure at the two sides of the shoe.

5. A heel lasting mechanism, having, in combination, a heel band and supporting means connected with the end portions of the band for closing the band, said means comprising an angle lever having an adjustable arm connected to the band.

6. A heel lasting mechanism, having, in combination, a heel band and supporting means connected with the end portions of the band for closing the band, said means comprising an actuator, an angle block on said actuator having an extensible arm connected to the heel band, and means for locking the said extensible arm in adjusted relation to the angle bar.

7. A heel lasting mechanism, having, in combination, a heel band, the endwise movable slide bar 192, the angle block 194 fulcrumed thereon, the spring 195 connected to said angle block, the endwise adjustable arm 280 mounted in said angle block and connected to the heel band, and locking nuts 198 for securing said arm in adjusted position.

8. A heel lasting mechanism, having, in combination, a heel embracing band, a relatively narrow chain to actuate the band, and band supports depending from the narrow chain along the outer sides of the band and having inturned supporting fingers extending under the band.

9. A heel lasting mechanism, having, in combination, a heel embracing band, a relatively narrow chain to actuate the band, and band supports comprising vertically movable hooks engaging under the lower edge of the band.

10. A heel lasting mechanism, having, in combination, a heel embracing band, a wiper and means for holding the upper edge of the band yieldingly toward the wiper.

11. A heel lasting mechanism, having, in combination, a heel embracing band, a wiper, and band supporting means having provision for adjustment of the band toward the plane of the wiper as and for the purpose described.

12. In a lasting machine, the combination with a lasting band of levers supporting its ends, longitudinally movable supports for the levers and means 282 fulcrumed for lateral movement carrying said supports, and means 285, 285 connected together and movable transversely of the machine for moving said supports relatively to their carrying means.

13. The combination with a heel band, of band actuating bars 192, laterally movable means 286 sustaining said bars, lateral abutments 285 on said sustaining means, and the wedge faces 284 coöperating with said abutments to force the ends of the band inwardly when the parts are relatively actuated lengthwise of the shoe.

14. An end lasting mechanism having, in combination, an end embracing band and operating mechanism therefor comprising levers each of which is connected at one end to a band end and is secured yieldingly at its other end, swinging slide bars upon which the levers are fulcrumed, a plunger and cross-head to advance said slide bars, a transversely movable equalizer to effect swinging of said slide bars and to be moved by them, and coöperating cam surfaces between said slide bars and said equalizer whereby upon movement of said cross-head said equalizer may swing said slide bars and then itself be moved transversely of the machine.

15. An end lasting mechanism having, in combination, an end embracing band and operating mechanism therefor comprising swinging slide bars connected with the ends of the band, a plunger and cross-head to advance said slide bars, a transversely movable equalizer to effect swinging of the slide bars and to be moved by them, and coöperating cam surfaces between said slide bars and said equalizer to effect swinging of the slide bars and then transverse movement of the equalizer when the cross-head and plunger are advanced.

16. An end lasting mechanism having, in combination, an end embracing band and band end advancing and closing mechanism including coöperating devices one of which is provided with cam faces to effect closing of the band ends and one of which is mounted for self adjustment transversely of the machine to equalize band closing pressure at the two sides of an unsymmetrical last.

17. An end lasting mechanism having, in combination, an end embracing band and band advancing and end closing means including an equalizer which is independent of the means which produces advance movement of the band and which is arranged to insure like closing pressure at the opposite sides of an unsymmetrical last.

18. An end lasting mechanism having, in combination, an end embracing band, means to advance the band ends and to move them inwardly as an incident to the advancing movement, and inward movement controlling means for the two band ends which is automatically movable transversely of the machine to equalize the band closing pressure.

19. An end lasting mechanism having, in combination, an end embracing band, end supporting levers, slide bars to which the levers are pivoted, a cross-head connecting the slide bars, a plunger rigidly fastened to the cross-head to advance the slide bars equally and together, and an equalizer movable transversely of the machine to cause the slide bars to turn to one side or the other for permitting the band to conform to the swing of the last.

20. An end lasting mechanism having, in combination, an end embracing band, slide bars for moving the band ends forwardly and inwardly, and guiding means for the slide bars mounted for movement during the band closing operation to effect different

band closing movement by the bar on one side of the shoe from that effected by the bar on the other side of the shoe for the purpose described.

21. An end lasting mechanism having, in combination, an end embracing band, means for advancing and closing the ends of the band including a transversely movable equalizer for the closing pressure and multiple pin and slot guiding connections for maintaining constant angular position of the equalizer in its movements.

22. An end lasting mechanism having, in combination, an end embracing band having pivoted end supports, slide bars carrying said end supports, and means both to advance and to swing said slide bars to cause the band to embrace the shoe, said means including a member which is automatically movable transversely of the shoe to equalize the band closing pressure at the two sides of the shoe.

23. An end lasting mechanism having, in combination, an end embracing band having pivoted end supports, supporting means for said end supports mounted for movement toward and from said band, and means mounted for self adjustment transversely of the machine to move said supporting means for effecting equal pressure at the two sides of an unsymmetrical last.

24. An end lasting mechanism having, in combination, an end embracing band having end supports and actuating devices for said two supports including equalizing means movable transversely of the machine by wedge action to allow the relative extents of movement of the two end supports to be determined by the shape of the shoe.

25. An end lasting mechanism having, in combination, an end embracing band, pivoted end supports, means to advance said supports, and means also to move said supports with their pivots toward the band, said last mentioned means having provision for permitting movement of opposite end supports together in the same direction transversely of the machine for positioning the band to apply equal pressure at opposite sides of an unsymmetrical shoe.

26. An end lasting mechanism having, in combination, an end embracing band and actuating mechanism to tension forwardly and to close the band ends including a plunger, a cross-head held against angular movement relatively to the plunger, slide bars receiving forward movement from the opposite ends of the cross-head and transmitting such movement to the band ends, and means arranged to close said bars toward the last and to equalize closing pressure against opposite sides of unsymmetrically formed lasts.

27. An end lasting mechanism having, in combination, an end embracing band and actuating mechanism to tension forwardly and to close the band ends, including a plunger, slide bars, connections permitting lateral movement of the rear ends of the slide bars relatively to the plunger, and means for effecting such lateral movement of the slide bars which is constructed and arranged for self adjustment to equalize band closing pressure at the two sides of the shoe.

28. An end lasting mechanism having, in combination, an end embracing band, endwise and inwardly movable slide bars coöperating with opposite ends of the band, operating means arranged to advance both bars the same distance and a transversely movable equalizer for closing the band with equal pressure against opposite sides of an unsymmetrical last.

29. An end lasting mechanism having, in combination, an end embracing band, bars mounted to slide longitudinally of the machine and coöperating with opposite ends of the band, means to advance said bars equally at the two sides of the machine, and means adapted to effect inward closing of the band ends during said advance and having provision for equalizing the band closing pressure at the two sides of an unsymmetrical last.

30. An end lasting mechanism having, in combination, an end embracing band, means for advancing the band ends longitudinally of the shoe, and additional means movable transversely of the shoe and having its position controlled automatically by the work to effect equal band end closing pressure against the two sides of an unsymmetrical shoe.

31. An end lasting mechanism having, in combination, an end embracing band, and operating means having provision for closing the end portions of the band inwardly against the sides of the shoe after the band has been drawn against the end of the shoe, and an equalizer having a bodily movement transversely of the machine to distribute band end closing pressure equally at opposite sides of an unsymmetrical shoe.

32. A lasting mechanism having, in combination, an end embracing band, slide bars for moving the band ends forwardly and inwardly, a cross-head for moving the slide bars, and a plunger upon which the cross-head is secured against pivotal movement, said machine including an element which is automatically movable transversely of the machine to equalize band end closing pressure upon unsymmetrical lasts.

33. An end lasting mechanism, having in combination, an end embracing band and operating means therefor comprising levers each connected at one end to a band end and having its other end yieldingly secured, slide bars upon which the levers are fulcrumed, a plunger and connections to advance the slide bars, inclines formed on the

slide bars to wedge them inwardly as they are advanced and a transversely movable equalizing yoke carrying abutments for the opposed inclines for the purpose described.

34. In a lasting machine the combination with a heel embracing band, of supporting and operating slide bars, bell crank levers mounted thereon and carrying the band substantially as described, inclines on said slide bars, and guiding devices against which said inclines engage and which are connected and movable together transversely of the machine for the purpose stated.

35. An end lasting mechanism comprising an end embracing band that is adapted to be clasped about the end portion of a last, wipers that are adapted to be moved over the last bottom and supports for sustaining the band which are arranged relatively thereto to permit the band to follow the shoe in an upward movement for compressing the overwiped upper between the wipers and the last bottom.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MATTHIAS BROCK.

Witnesses:

ARTHUR L. RUSSELL,

HERBERT W. KENWAY.

Correction in Letters Patent No. 1,002,818

It is hereby certified that in Letters Patent No. 1,002,818, granted September 12, 1911, upon the application of Matthias Brock, of Boston, Massachusetts, for an improvement in "Lasting Mechanisms," an error appears in the printed specification requiring correction as follows: In the heading, the words "Application filed March 19, 1910," should read *Original application filed October 16, 1909, Serial No. 522,987. Divided and this application filed March 19, 1910;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of October, A. D., 1911.

[SEAL.]

E. B. MOORE,

Commissioner of Patents.

232

E. L. KEYES.

MACHINE FOR USE IN THE MANUFACTURE OF SHOES.

APPLICATION FILED APR. 30, 1908.

1,023,854.

Patented Apr. 23, 1912.

5 SHEETS—SHEET 1.

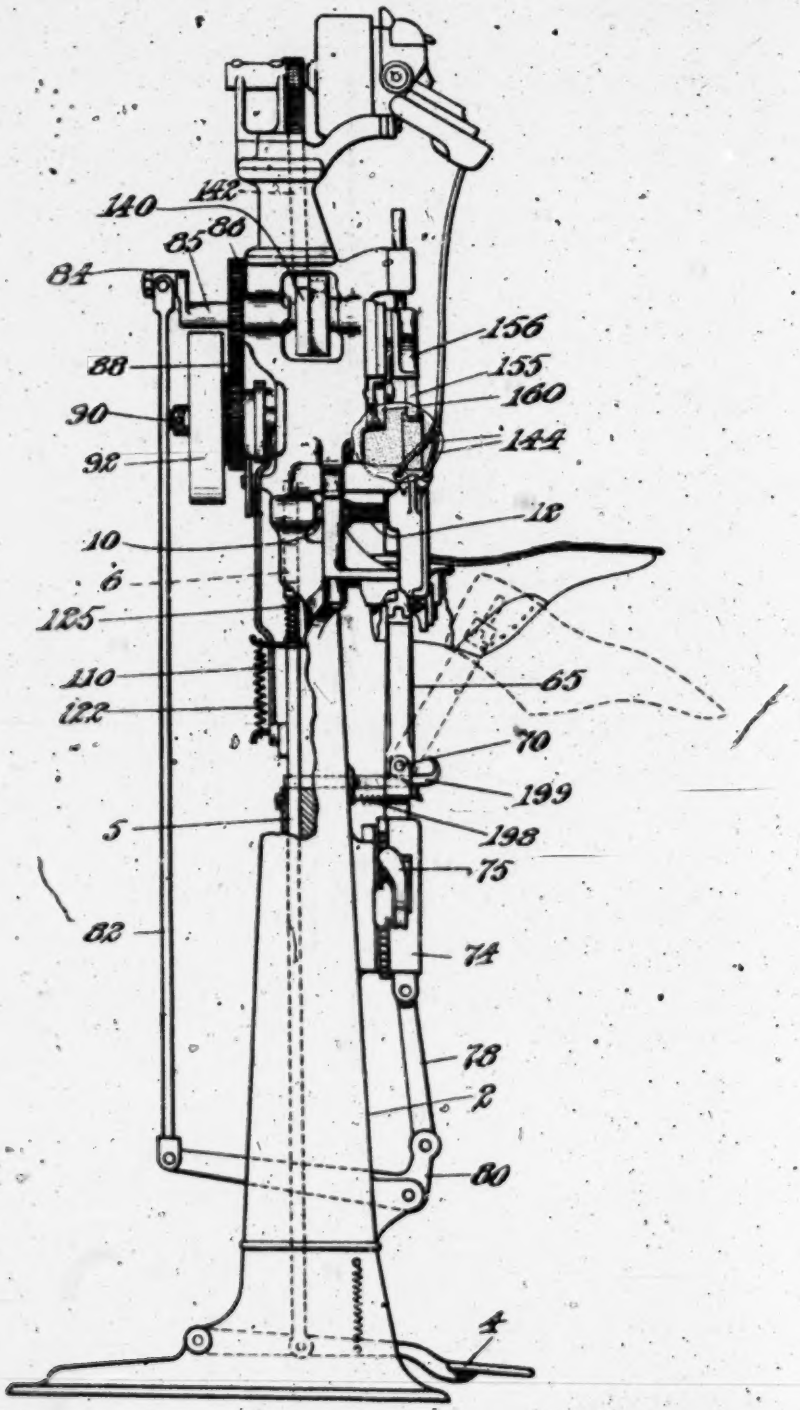


Fig. 1.

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MACHINE FOR USE IN THE MANUFACTURE OF SHOES.

APPLICATION FILED APR. 30, 1908.

1,023,854. Patented Apr. 23, 1912.

5 SHEETS—SHEET 2.

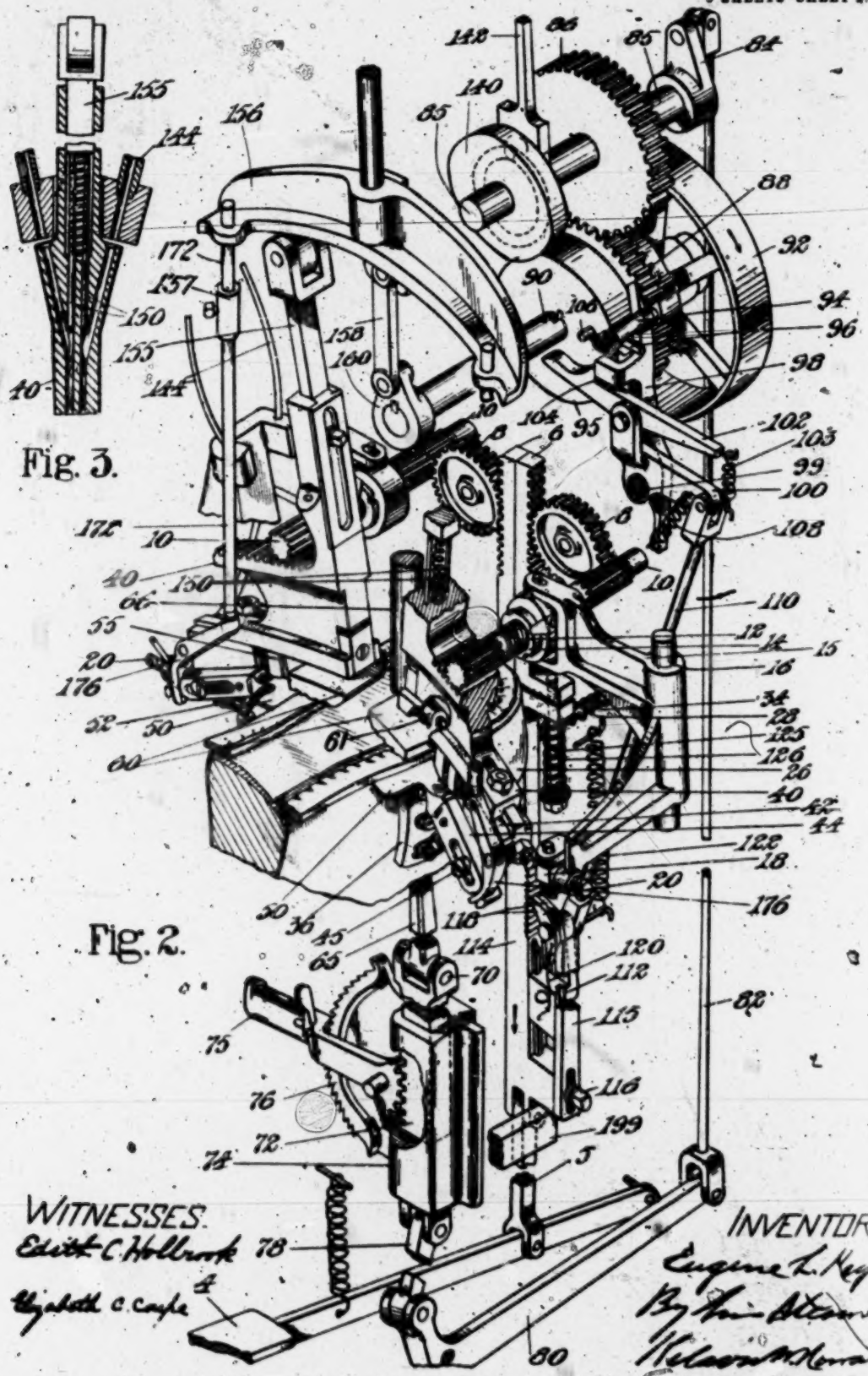


Fig. 3.

Fig. 2.

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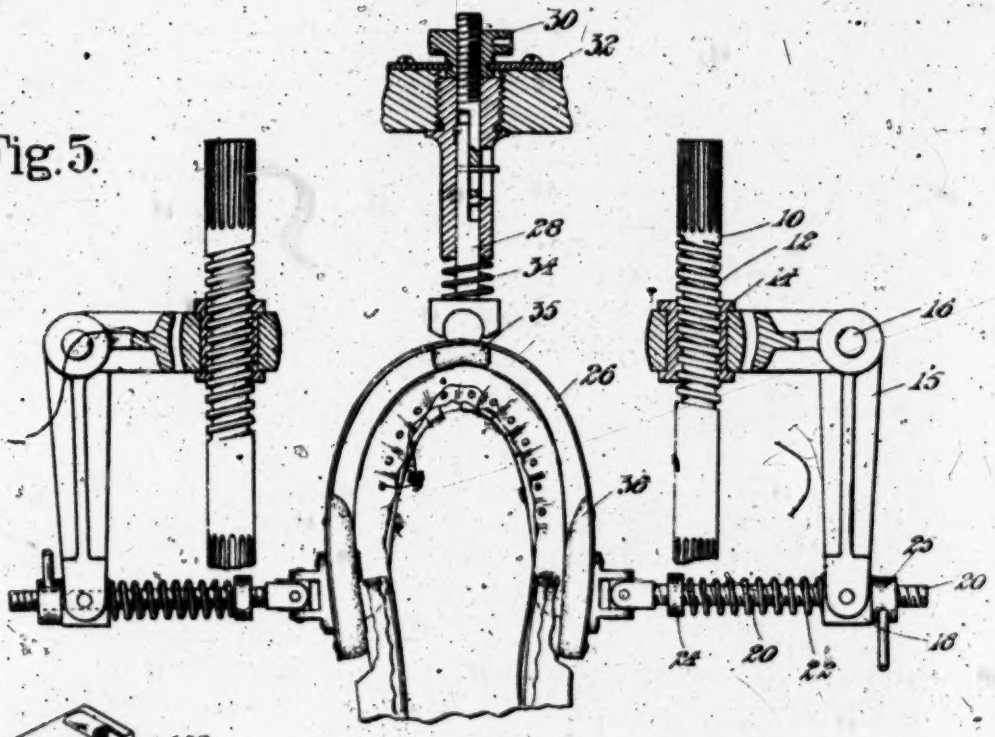
MACHINE FOR USE IN THE MANUFACTURE OF SHOES.

APPLICATION FILED APR. 30, 1908.

1,023,854. Patented Apr. 23, 1912.

5 SHEETS-SHEET 3.

Fig. 5.



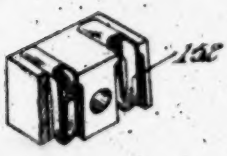


Fig. 4.

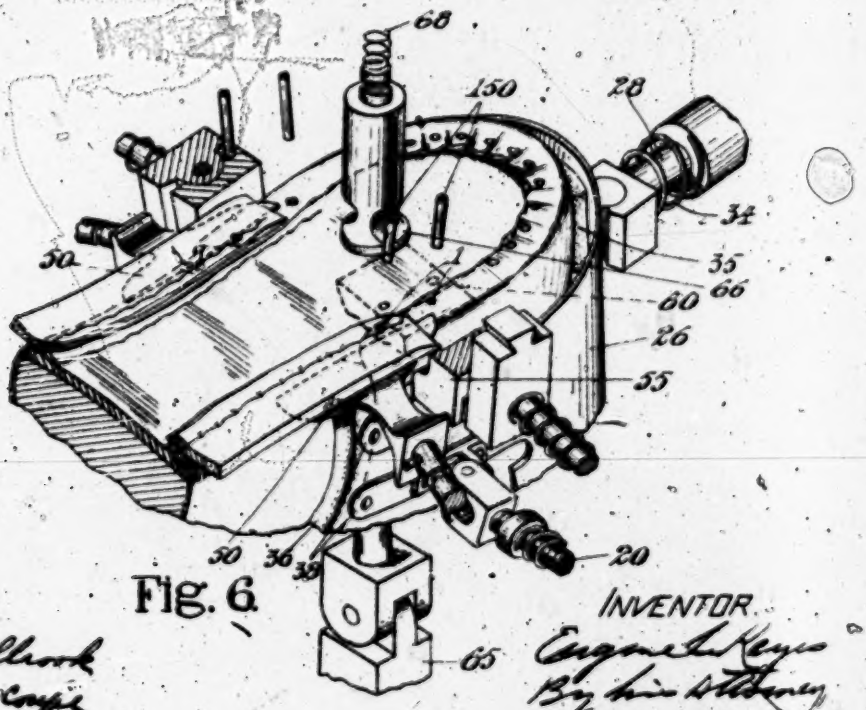


Fig. 6.

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MACHINE FOR USE IN THE MANUFACTURE OF SHOES.

APPLICATION FILED APR. 30, 1908.

1,023,854. Patented Apr. 23, 1912.

5 SHEETS—SHEET 4.

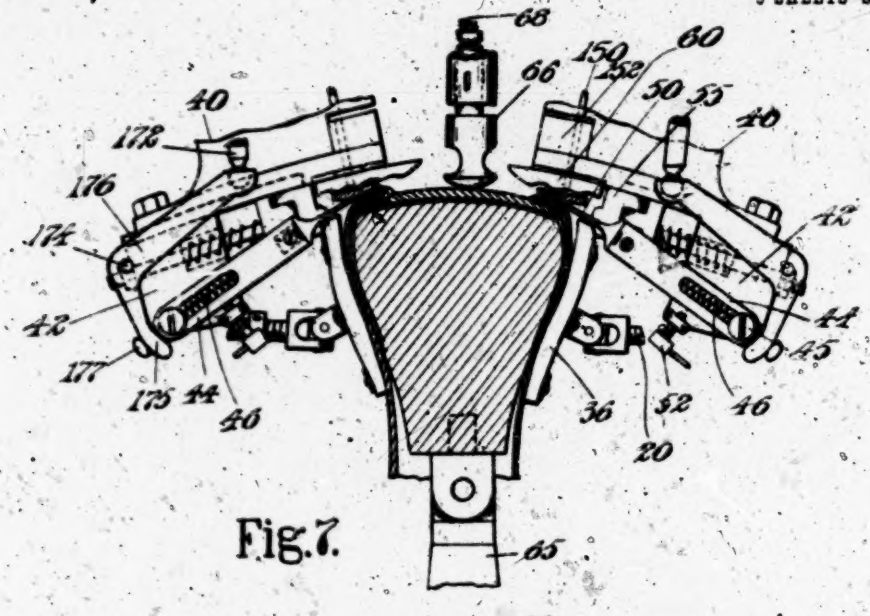


Fig. 7.

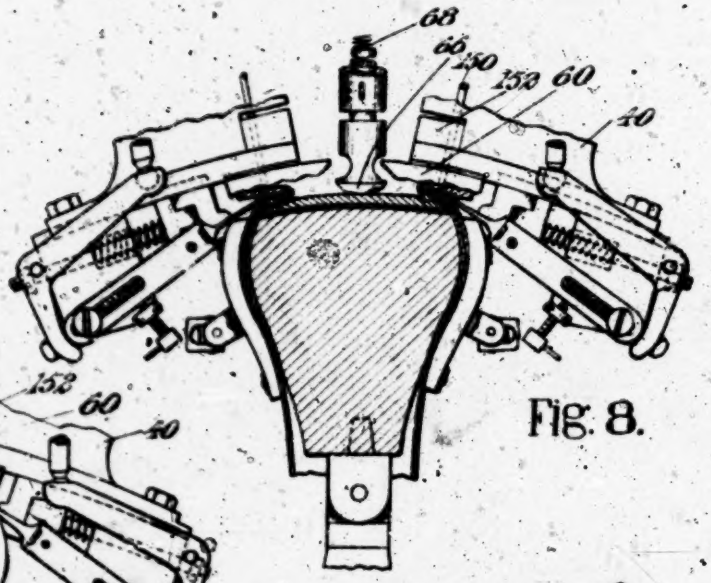


Fig. 8.

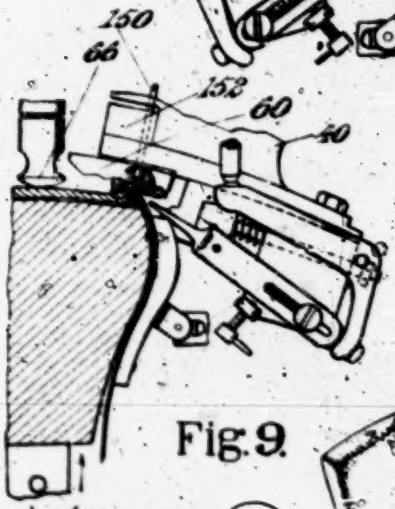


Fig. 9.

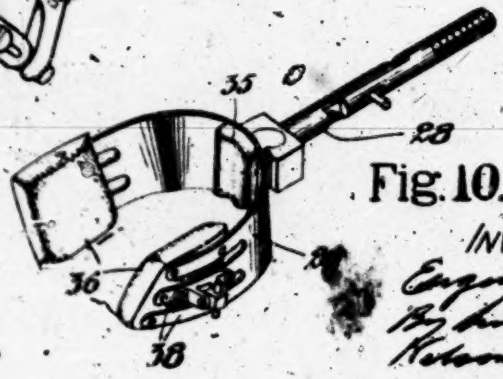


Fig. 10.

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MACHINE FOR USE IN THE MANUFACTURE OF SHOES.

APPLICATION FILED APR. 30, 1908.

1,023,854.

Patented Apr. 23, 1912.

5 SHEETS—SHEET 5.

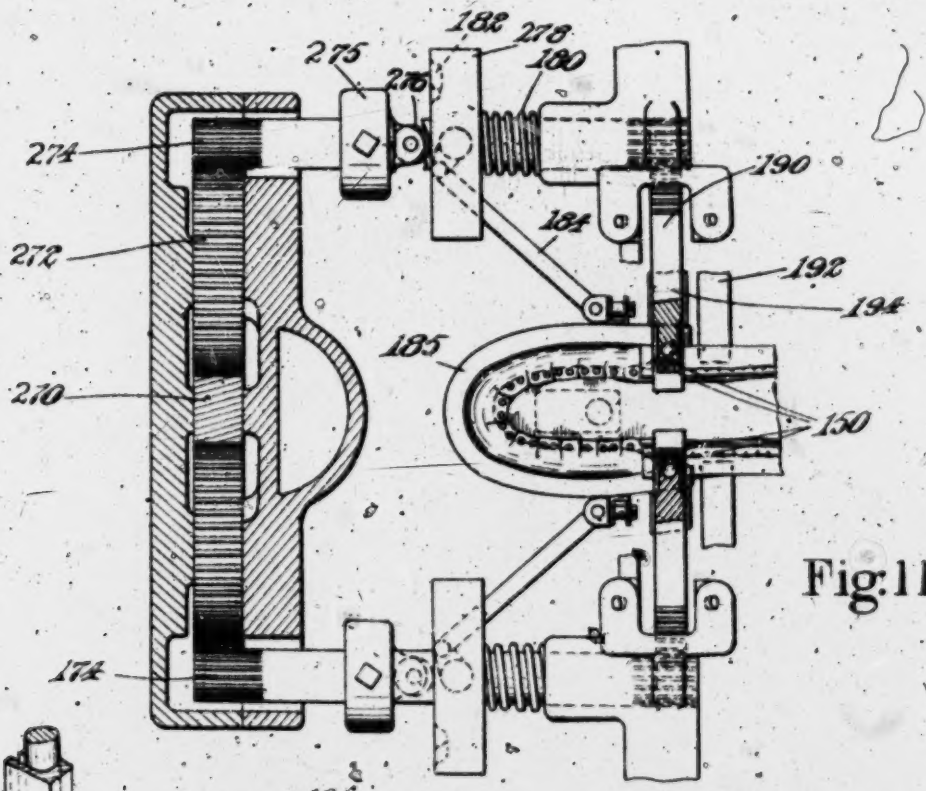


Fig. 11.

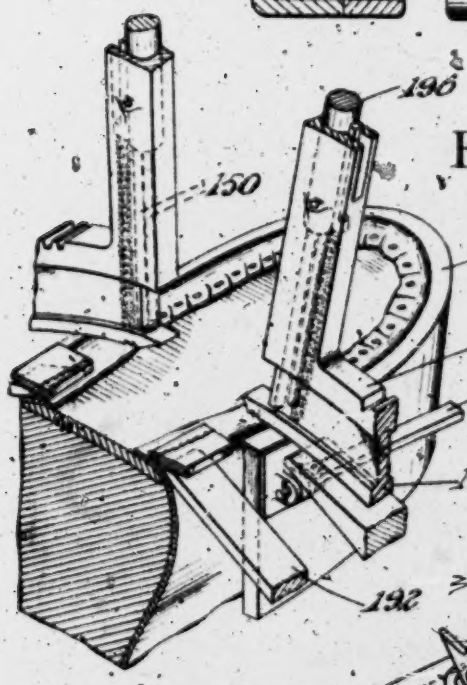


Fig. 12.

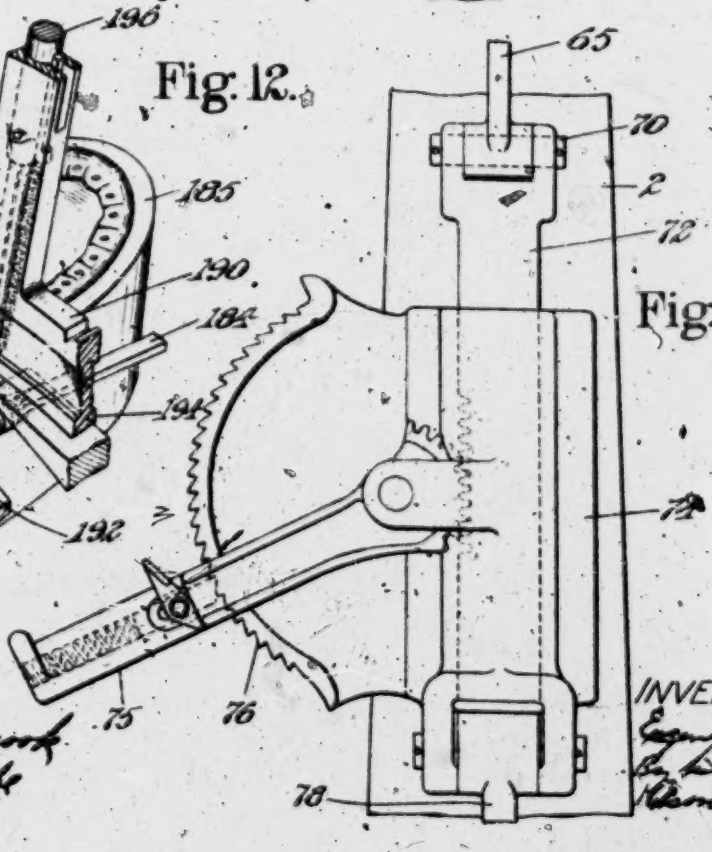


Fig. 13.

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Attorneys

UNITED STATES PATENT OFFICE.

EUGENE L. KEYES, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF SHOES.

1,023,854. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed April 30, 1908. Serial No. 430,137.

To all whom it may concern:

Be it known that I, EUGENE L. KEYES, a citizen of the United States, residing at Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Use in the Manufacture of Shoes, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for use in the manufacture of boots and shoes and the several features of the invention are herein illustrated, for the purpose of explanation, as embodied in a machine especially adapted for use upon a shoe having an outturned flange. The Goodyear, or "welt," shoe is the most familiar example of this type of shoe and the use of the invention is herein explained in connection with the manufacture of welt shoes.

The general object of the invention is to provide mechanism by which the fitting of the upper materials to the last may be expeditiously effected and particularly to provide a mechanism by which the upper in the portions of the shoe on the sides and bottom of the last at and near the ends of the heel stiffener may be conformed to the last. In making welt shoes the upper, after having been stretched over the last in the lasting operation, is secured to the innersole at the heel seat end of the shoe by fully inserted tacks. At the sides and toe of the shoe the upper is secured by temporary fastenings which are later withdrawn and the upper is permanently fastened by stitches to the usual upstanding lip of the innersole. These stitches also pass through the inner edge of a strip of welting called the "welt" which forms an outturned sole attaching flange of shoe stock at the edge of the shoe. These stitches form the "inseam" of the shoe as distinguished from the outer seam by which the outer sole is later sewed to the welt. In forming the inseam the shoe is positioned by a channel guide that engages the base of the lip on the innersole in advance of the stitch-forming devices. The presence of this guide in advance of the stitch-forming devices prevents the inseam being carried up to the heel seat tacks on the side of the shoe where the inseam is completed and it is also impractical to begin the inseam close to the tacks on the other side. There is usually, therefore, a space at each side of the shoe in which the upper is not secured to the innersole either by the heel seat tacks or by the inseam. This unsecured portion of the upper is located adjacent to the end portions of the heel stiffener which very often spring away from the last and pull the upper outwardly at the unsecured places. It is the practice in the manufacture of many shoes to extend the inseam to include the front end of that portion of the heel stiffener that overlies the last bottom. When this is done, if the stiffener has sprung away from the last, the end portion of the inseam is liable to be further out toward the edge of the last than it should be. In addition to such looseness as that described, which is frequently observable in a shoe after the welting operation, a further looseness is liable to be developed in the heel attaching operation. In this operation the heel portion of the shoe is subject to heavy pressure and if the upper has not been drawn tight and firmly secured prior to this operation it is liable to be bulged outwardly and this detracts from the appearance and the fit of the shoe. These portions of the shoe stock which are located adjacent to the end portions of the heel stiffener, and which seldom, if ever, fit as snugly to the contour of the last as they should do, are forced into position and secured by the illustrated machine embodying this invention. Numerous novel features of the invention are found in the construction and arrangement of the apparatus to adapt it for this purpose. In an earlier application Serial No. 399,520, is shown an apparatus for the same general purpose that is arranged to act upon one side of the shoe at a time.

An important feature of the present invention consists in providing means for operating simultaneously on the two sides of the shoe. The preferred construction is arranged to operate, upon a wide range of sizes and shapes of shoes without special adjustments and to this end it comprises upper tightening means movable one toward the other, through distances which may vary according to the size and shape of the last, to force the upper into desired relation.

An important characteristic of the upper tightening mechanism preferably employed

is found in an upper engaging member constructed and arranged to engage the side of the shoe progressively from near the quarter and vamp seam upwardly toward the edge of an inverted shoe. This member works any slack stock there may be upwardly while forcing the upper and heel stiffener against and into conformity with the side faces of the last. Said engaging member is preferably employed with other devices that engage the upper and preferably the welt to tighten the upper over the edge of the last and hold it in position to be secured. The use of the engaging member to work the slack toward the edge of the last and clamp the upper and heel stiffener to the wood renders unnecessary any severe straining of the insteam by the devices that engage the welt or inseam and avoids liability of injuring the upper or weakening the inseam.

A further feature of the invention is found in the devices which engage the shoe stock at and adjacent to the inseam to tighten the upper over the edge of the last. These devices, as herein shown, comprise a blade arranged to wipe over the edge of the shoe and enter the crease between the upper and welt where it finds a bearing against the insteam for pressing the shoe stock firmly inwardly over the last bottom. Oppositely arranged blades are located to engage opposed sides of the shoe and they are mounted so that they can yield relatively to adapt themselves to the position of the engaged surfaces and preferably they are supported for a slight turning movement that will enable them to adapt themselves to the slight variations that may be expected in the contour of the engaged surfaces. Manually controlled means is provided by which the presser blades may be advanced repeatedly to work the shoe stock into desired position.

In accordance with a further feature of the invention means is provided which is adapted to engage the upper side of the welt and the inseam and in wiping over the shoe bottom to force the shoe stock inwardly. When employed with the presser blade the wiper holds the welt from upward displacement by the blade which preferably is inclined upwardly to facilitate tightening the upper over the edge of the last.

Another object of this invention is to prepare the surface of the shoe bottom for the reception of the outersole. The welt attaching operation leaves the channel lip, the upper, the edge of the welt and the edge of the heel stiffener upstanding more or less and presenting projections that offer an unsatisfactory seat for the outer sole, especially at that portion that will be covered by the fore part or breast of the heel.

An important feature of this invention consists in shaping the shoe bottom for the reception of the outersole and particularly the shoe stock of that portion of the inseams at and adjacent to the location of the breast line of the shoe. As herein shown the shaping of the shoe bottom is effected by compression, which compacts the several portions of upstanding stock against the innersole and levels the surface to form a firm and even seat for the heel seat end of the sole.

The invention is not, of course, limited to shaping the shoe bottom by compression as the result could of course be accomplished in a more or less satisfactory degree in other ways. Preferably, however, the shaping of the shoe bottom, especially if this is done by compression, will be effected after the upper has been tightened over the edge of the last and while it is held in such condition so that it will be molded into its final position on the shoe bottom. The compression of the stock of the bottom of the shoe is herein shown as effected by raising the shoe support to force the shoe upwardly against the wipers referred to which are moved inwardly over the bottom of the shoe in forcing the upper into tightened relation to the last. To this end the work engaging surfaces of these wipers is extensive enough to cover the portions of the shoe bottom that it is desirable to compress. Preferably the presser blades are withdrawn from the bottom of the welt crease as the pressure is applied so that they offer no obstruction to the compression of the stock.

A further feature of the invention consists in the provision of fastening inserting mechanism constructed and arranged with relation to the other operating devices of the machine to secure the shoe stock while it is held in the position to which it has been forced. This mechanism preferably includes means arranged at each side of the machine and having a movement into an operative position determined by the movement of the stock engaging devices. Provision is made for driving one tack into the butt end portion of the welt and another tack into the upper in the space between the end of the inseam and the row of heel seat tacks.

Another feature of the invention consists in the mechanism employed to actuate the several devices. This mechanism includes manually controlled means by which the several devices for tightening the upper may, without adjustment, be caused to operate in the desired order upon shoes of different sizes and may, if desired, be actuated a plurality of times. When the shoe stock has been satisfactorily manipulated a further movement of the manually controlled means sets into operation power driven mechanism by which the stock is compressed for leveling the shoe bottom and the securing tacks are

driven for fastening the stock while it is held in position and while it is under compression.

These and other features of the invention, including numerous details of construction and combinations of parts, will be more fully explained in the following description and then pointed out in the claims.

In the drawings which represent one embodiment of the invention.—Figure 1 is a side elevation of the machine. Fig. 2 is a perspective view with parts broken away and showing many of the operating parts of the machine. Figs. 3 and 4 are details of the tacking mechanism. Fig. 5 is a plan view of portions of the machine in the plane of the shoe bottom. Fig. 6 is a perspective view showing further details. Figs. 7, 8 and 9 are end elevations of some of the operating devices in different stages of their operation on a shoe which is shown in section. Fig. 10 is a perspective view of the heel embracing clamp. Figs. 11 and 12 are respectively plan and perspective views of a slightly modified construction and arrangement of parts shown in Figs. 5 and 6. Fig. 13 is a side elevation of the heel spindle adjusting means that is shown in perspective in Fig. 2.

The column 2 of the machine has support for a treadle 4 connected by means of a rod 5 and intermediate devices with rack bars 6. Each of these rack bars actuates a series of devices at one side of the shoe. These devices at the two sides of the shoe are alike and it is, therefore, necessary to describe only one. The bars engage pinions 8 arranged to turn shafts 10 positioned at opposite sides of the machine and each is provided with a screw-threaded portion 12 which receives a sleeve 14 loosely mounted on the inwardly projecting arm of a bell crank 15. The bell crank is arranged to turn about an axis 16 fixed in the head of the column and its forward end is pivotally connected, as shown in Fig. 5, to a sleeve 18 adapted to slide on a rod 20. The bell crank acts through a spring 22 that surrounds the rod and abuts against a collar 24. A stop 25 is threaded on the outer end of the rod 20. By this arrangement the outward movement of the rod is unyieldingly effected and the inward movement is yieldingly effected. The rod is connected at its inner end to a heel embracing band 26 arranged to extend around the heel portion of the shoe and supported at its rear end by a rod 28 that is guided in the frame of the machine. This rod is made in two overlapping sections, as shown in Fig. 5, and extends through a threaded nut 30 mounted between holding plates 32 in the frame so that the rod or its rear section may be adjusted lengthwise. A spring 34 surrounds the front section of the rod between the frame and the heel band and normally holds the band in an advanced position, but permits it to be pressed backwardly. The band is provided at 35 with a shoe engaging pad which with the band constitutes the back stop for the shoe which is to be operated upon in the machine. The band is provided near its front ends with extended pads 36 for engaging the sides of the shoe at and adjacent to the front ends of the heel stiffener. The band is preferably formed as shown in Fig. 10 with its side portions so bent or twisted that the pads 36 engage the shoe first at their lower edges. As the pads are then forced inwardly by their operating devices the line of contact progresses upwardly and the area of engagement spreads toward and preferably substantially to the edge of the shoe, thus gathering up any slackness in the stock on the side of the heel and working it to the edge of the shoe. The front end portions of the band may be formed as shown in Fig. 9 by separate fingers 38 to render these portions of the band more flexible.

The shaft 10 has at its forward end toothed engagement with rack teeth on the sliding carrier 40 which is movable transversely of the machine in suitable guideways formed in the head of the column. The carrier 40 has tongue and groove connection with a block 42 that is arranged for adjustment inwardly and outwardly, and pivotally supports a presser 44 which is slotted, as shown in Fig. 7, to embrace a stud 45 which acts through the spring 46 for yieldingly actuating the presser. This presser is provided at its inner end with a blade 50 which may be formed as shown best in Fig. 6 to engage the shoe stock at and adjacent to the edge of the last and to enter the crease between the upper and the outwardly projecting sole-attaching flange or welt of the shoe. The presser 44 is arranged for pivotal movement about the stud 45 and is supported from below by an adjustable stop 52, while the blade 50 rests upon and is guided by the upper edge of the pad 36 into position to engage the shoe under the welt. The block 42 also preferably supports yielding devices 55 arranged to engage the upper edge portion of the pads 36 for insuring the clamping engagement of the edge portion of the pad with the upper close to the edge of the last, as shown in Fig. 8. The carrier 40 also supports on its lower inner edge a wiper or presser 60 beveled at its front end and preferably corrugated on its lower face and adapted to move inwardly over the welt and the inseam to assist the presser blades 50 in tightening the shoe stock over the edge of the last.

A spindle or rest 65 supports the shoe against an abutment or rest 66 depending

from the machine in position to engage the heel portion of the shoe bottom. This abutment may be arranged to yield upwardly against the tension of a moderately stiff spring 68. The spindle is shown as pivoted at 70 to a rack bar 72 and adapted to swing outwardly into the dotted line position shown in Fig. 4 to facilitate the application and removal of the shoe. The rack bar 72 extends through a member 74 guided in the side of the column 2 and is engaged by a toothed lever 75 pivoted to the member 74 by which the spindle and the shoe may be manually uplifted to present the shoe in position to be operated upon after it has been swung from the dotted line position into the full line position shown in Fig. 1. The lever 75 has a pawl for engaging a ratchet 76 to hold the lever in adjusted position. The member 74 has connection through the link 78 with the upwardly projecting arm of a bell crank lever 80, said arm and link forming a toggle.

The bell crank 80 is pivoted to a bracket extending from the column of the machine and at its rear end is connected by a rod 82 with a crank 84 on a shaft 85, which is mounted in suitable bearings in the head of the column and is driven through gears 86 and 88 from the driving shaft 90, on which runs loosely a pulley 92. A clutch bolt 94 extends from a collar 95 fast on the driving shaft through the gear 88 and into the hub of the otherwise loose pulley 92. The clutch bolt has a pin 96 extending through a slot in the collar 95 into position to be engaged by the inclined face of a clutch controlling device 98. This controlling device is pivotally mounted on a stud 99, which also supports a lever 100 that carries a tilting bar 102, having on its inner end a shoulder 104 adapted to be held by the spring 103 in engagement with the device 98 and withdraw that device from the stud 96 when the lever 100 is rocked. The collar 95 has a stud 106 arranged to engage the inner end of the tilting bar 102 after the machine is started and swing the shoulder 104 downwardly away from the controlling device 98 to permit the spring 108 to return said device into position to engage the stud 96 when the driving shaft has completed one revolution. Any other usual form of one revolution clutch mechanism may be substituted for that described.

The lever 100 above referred to as the actuator for the clutch controlling device is connected by a rod 110 to a block 112 arranged for sliding movement in a frame 114, which constitutes one member of the connection between the treadle rod 5 and the rack bars 6 earlier referred to. This frame 114 has the slide bar 115 arranged for endwise adjustment by a screw and slot at 116 and formed at its upper end for engagement with the tails of pawls 118 carried by the block 112. This plate 115 holds the pawls out of engagement with a series of ratchet teeth formed on the frame 114 until the frame has been moved downwardly with relation to the block 112 and to said pawls far enough to release the latter. A spring 120 thereupon throws the pawls into engagement with the ratchet teeth and the frame and the pawls then form a connection between the treadle rod and the clutch rod 110 by which the latter and the clutch are actuated from the treadle. A spring 122 is arranged to sustain the weight of the block 112 and raise it after it has been depressed by the engagement of the pawls with the frame 114. The upper end of the frame 114 is formed with laterally projecting arms yieldingly connected with the rack bars 6 by the rods 125 and springs 126, one only of which is shown in Fig. 2.

The actuation of the driving shaft when the clutch is operated turns the shaft 85 and the crank 84 thereon to communicate motion to the last supporting spindle for raising the shoe against the pressers 60, whereby the shoe stock engaged by said pressers is compressed and leveled down upon the shoe bottom to form a seat for the outersole. The spring 68 permits the abutment or bottom rest 66 to yield during the compressing operation so that the entire compressing force is received by the pressers 60. The shaft 85 carries also a cam 140 for actuating a rod 142 that extends to a tack separating and delivering mechanism supported on the head of the column. This mechanism forms no part of the present invention and may be of any suitable construction adapted to supply a plurality of tacks to the conductors 144 at each operation of the machine. The tack supplying mechanism is timed to deliver the tacks from the conductors when the carrier 40 occupies its retracted position away from the shoe, in which position it stands in the relation to the conductors that is illustrated in Fig. 3. Said carriers 40 are provided, as shown in that figure with two tack passageways leading into the passages through which drivers 150 are movable. These driver passages terminate in tack holders mounted in a block 152 detachably secured to the carrier and shown separately in Fig. 4. The drivers 150 are carried by a bar 155 which is guided in the carrier 40 and provided on its upper end with a roll for making contact with the driving head 156. This driving head is connected by a link 158 with a crank 160 on the shaft 90. This crank is set to actuate the drivers for inserting tacks into shoe stock while the stock is under compression between the last bottom and the pressers 60. The presser 60 are recessed to permit tacks to be driven through them, as shown in Fig.

6, and will preferably be connected to the carriers 40 as indicated at 61 in Fig. 2 to permit them to rock laterally for adjusting themselves to the surface of the work. This is particularly advantageous when, as shown herein, the wipers engage the beveled butt ends of the welt.

The blade carriers 44 are each connected with a bell crank 176, see Fig. 7, that is pivotally connected at 174 with the block 40 and has a lower arm 175 that engages an extension 177 on the carrier 44. The upper arm of the bell crank is connected to a rod 172 which extends upwardly and is guided in the nailing head 156. A collar 157 is adjustable on the rod and is positioned to be engaged by the nailing head for retracting the presser blades 50 from the welt crease as the shoe is raised to compress the stock against the wipers. The parts are relatively timed so that the blades hold the shoe stock in its tightened condition until sufficient pressure has been applied so that while it is held by the wipers the blades are withdrawn in season to prevent them from constituting an obstruction to the compression of the stock of the inseam.

In Figs. 11 and 12 a modified construction is shown in which a single rack bar 270 engages through teeth on its opposite edges with pinions 272 to turn shafts 274. Each of these shafts is provided with a collar 275 having on its front face near one edge an ear upon which is mounted a roll 276. The shaft 274 also supports a disk 278 that is loose on the shaft and held against the roll 276 by a spring 180. The disk 278 has a depression 182 in the path of the roll 276 and located in suitable angular position so that when the machine comes to rest the roll stands in the recess. The disk 278 is connected by the link 184 to the front end portions of a heel embracing band or clamp 185. This clamp and its actuating mechanism are adapted to serve the purpose of the band 26 and its pads 35 and 36. The front end portion of the shaft 274 is toothed to move the carrier 190, which is provided with a presser blade 192 and a wiper 194, together with tack driver bars 196 constructed and arranged for inserting tacks, substantially as described in connection with the main views.

In the use of the machine a shoe, which may have been previously lasted and welted, may be applied to the spindle 65 as indicated in dotted lines in Fig. 1. The shoe is swung into the full line position, during which movement it is thrust into the heel embracing band and stopped against the yieldingly supported pad 35. The pad together with the band will have been positioned by the adjusting device 30 so that shoes of the average size to be operated upon in a single adjustment of the parts will be stopped with the butt end portions of the welt and the forward portions of the heel stiffener in suitable relation to the pads 36 and the presser blades 50, which relation may be substantially that shown in Fig. 6, it being understood that the pads 36, the presser blades and other devices at the opposite sides of the shoe occupy their separated or retracted positions when the shoe is thrust into the band. The spring 34 permits some variation in the position of the shoe in accordance with the judgment of the operator in order that the shoe may be located correctly with relation to the devices that are to operate upon it. When the shoe has been properly positioned the treadle 4 is depressed and through the rack bars 6 rotates the shafts 10. These shafts through the devices connected with them first move the pads 36 against the sides of the shoe at and adjacent to the end portions of the heel stiffener, clamping the upper and heel stiffener against the sides of the last at and adjacent to the end portions of the stiffener. As the pressure increases the area of contact spreads from the lower edges of the pads upwardly to the edge of the shoe, thus working any slack material toward the edge of the shoe and firmly clamping the shoe stock against the sides of the last. The presser blades are also actuated inwardly to engage the shoe stock in the welt crease, exerting their inward pressure against the upper and the welt and finally against the inseam to force the shoe stock and the inseam inwardly toward the middle of the last, tightening the upper and stiffener over the edge of the last and holding it under tension. The blocks 55 insure the clamping engagement of the upper edge portions of the pads with the shoe stock at the edges of the last at both sides thus coöperating with the presser blades in conforming the stock snugly to the contour of the last. The wipers 60 move inwardly with the presser blades and by the engagement of their roughened surfaces with the upper face of the welt assist in tightening the shoe stock over the edge of the last and holding it in proper relation to the last bottom. The wipers may also position the butt ends of the welt to receive the securing tacks. Both the pads 36 and the presser blades 50 are yieldingly connected with the carrier 40 so that these devices may adapt themselves without adjustment to different sizes or widths of shoes and to the different contours of the right and left sides of a shoe. If desired, the treadle may be moved up and down to press the stock into position by repeated movements of the described devices engaging the shoe. To enable such repeated movement of the treadle to be effected without liability of actuating the clutch a sliding stop 199 may be arranged, as shown in Figs. 1 and 2,

to stand normally under the carrier 111 and prevent the treadle being depressed far enough to disturb the clutch. This stop device is arranged to be readily withdrawn against the tension of its spring 198 when the stock has been forced into position to be compressed and secured. A final or further depression of the treadle serves to move downwardly the carrier 111 and when the plate 115 slides off the tails of the pawls 118 the pawls engage the ratchet teeth on the carrier and through the described connections cause the clutch controlling device 98 to be withdrawn from the path of the pin 96, whereupon the clutch bolt is automatically thrown into engagement with the continuously rotating pulley 92 and the shafts 90 and 85 are caused to make one complete revolution and are then arrested by the clutch controlling device. In this rotation of the shafts the crank 84 effects the elevation of the heel spindle, thus forcing the shoe upwardly against the wipers 60 and compressing the stock covered by the wipers against the bottom face of the last. While the stock is held under compression the crank 160 effects the driving of the tacks which may be inserted in the relation to the shoe indicated at 1 in Fig. 6, or in any other suitable relation. It will be noted that the wipers act at and adjacent to the location of the heel breast. By compressing this stock a firm seat is made for the heel, and the securing tacks, which are driven while the stock is so held, and prevent it from being forced outwardly by the compression which is incident to the heel attaching operation. During the power actuation of the machine the tack supplying devices are operated to separate tacks and to deliver them through the conductors 124 to the tack blocks 152 when the carriers 40 reach their outermost position. The yielding connections 125, 126 between the treadle and the rack bars 6 permit the final depression of the treadle for operating the clutch. It will be understood, however, that in this further depression of the treadle the springs 126 exert a final pull upon the rack bars, tending to force the wipers 60 inwardly over the shoe bottom while the shoe is being lifted against these wipers by the mechanism actuated from the clutch. The compression of the shoe stock is therefore effected by a relative movement of the last and pressers vertically and also a movement of the pressers inwardly so that a pressure oblique to the last bottom and inclined inwardly is effected just before the tacks are driven.

The tacking mechanism is preferably arranged as may be seen in Fig. 7 to drive the tacks in a direction inclined slightly inwardly so that if the tacks are long enough to extend through the innersole their points will strike obliquely against the usual iron plate on the bottom of the heel portion of the last and be clenched inwardly instead of outwardly. This provision avoids the liability of the tacks being turned outwardly where they might project into the upper and it also insures that the tacks shall have a drawing tendency to force the upper still more tightly into the last.

Having explained the nature of this invention and described a preferred construction embodying the same, I claim as new and desire to secure by Letters Patent of the United States:—

1. A machine for working the upper into lasted position adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising means constructed and arranged to engage the shoe stock at opposed sides of the shoe locally at or near the ends of said stiffener and tighten the upper over the edge of the last, and mechanism for fastening the upper.

2. A machine for working the upper into lasted position adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising means constructed and arranged to engage the shoe stock at opposed sides of the shoe and force the upper over the last bottom simultaneously at the two sides, and mechanism operatively connected with said means for inserting fastenings in position to hold the upper.

3. A machine for working the upper into lasted position adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising means constructed and arranged to engage the shoe stock at opposed sides of the shoe and tighten the upper about the last, and automatically operated mechanism for inserting fastenings at the opposite sides of the shoe to secure the upper while it is held in tightened relation to the last.

4. A machine for working the upper into lasted position adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising devices constructed and arranged to engage the shoe stock and force the upper inwardly and upwardly over the edge of the last at the two sides of the shoe and to hold the upper under tension, and mechanism operating automatically to drive fastenings simultaneously for securing the upper at the two sides of the shoe.

5. A machine for working the upper into lasted position adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising devices constructed and arranged to engage the flange at opposite sides of the shoe and tighten the upper over the edge of the last, and mechanism operating automatically to secure the upper while it is held tight at the two sides of the last.

6. A machine for tightening the upper

of a welt shoe adjacent to the ends of the heel stiffener, having means for engaging the butt end portions of the welt at opposite sides of the shoe and pressing the welt inwardly over the shoe bottom, and means for securing the end portions of the welt while they are held pressed inwardly.

7. In a machine of the class described, manually controlled means including devices constructed and arranged to engage a lasted welt shoe below the welt for tightening the upper over a last at opposed sides of the last simultaneously, and automatic mechanism for inserting fastenings to hold the upper at the two sides of the last.

8. In a machine of the class described, means constructed and arranged to tighten the upper over a last at points adjacent to the two ends of the heel stiffeners simultaneously, and automatic mechanism for inserting fastenings to hold the upper at the two sides of the last combined with means to sustain the shoe for the action of the tightening devices in a predetermined plane relatively to the shoe bottom and to support the shoe substantially unyieldingly against the impact of the fastening inserting mechanism.

9. In a machine of the class described, manually controlled means including devices constructed and arranged to engage a lasted welt shoe below the welt for tightening the upper over a last at opposed sides of the last simultaneously and connected mechanism for inserting fastenings automatically when a predetermined force has been applied to tighten the upper.

10. A machine for tightening the upper of a welted shoe adjacent to the ends of the heel stiffener, having means for engaging the shoe stock in the welt crease, actuating means therefor under control of the operator, and automatically driven means for inserting fastenings to secure the upper.

11. A machine for tightening the upper of a welted shoe adjacent to the ends of the heel stiffener, having means for engaging the shoe stock in the welt crease, actuating means therefor under control of the operator, and automatically driven means for compressing the stock upon the last bottom.

12. A machine for tightening the upper of a welted shoe adjacent to the ends of the heel stiffener, having means for engaging the shoe stock to force the upper over the edge of the last at the two sides of the shoe, said means having provision for controlling the position of the butt ends of the welt, and means for securing the upper.

13. A machine for tightening the upper of a welted shoe adjacent to the end of the welt, having means for entering the welt crease, means for engaging the opposed side of the welt, and mechanism for actuating said two means to press the welt and the attached upper inwardly over the edge of the last.

14. A machine for tightening the upper of a welted shoe adjacent to the ends of the welt, having means for engaging the opposed sides of the rear end portion of the welt, mechanism for actuating the engaging means inwardly relatively to the shoe bottom to tighten the upper attached to the welt, and means for inserting fastenings in position to secure the upper.

15. A machine for tightening the upper of a welted shoe adjacent to the ends of the welt, having means arranged at opposite sides of the shoe for entering the welt crease, means for engaging the upper side of the welt, and actuating mechanism for causing the upper to be forced inwardly at the two sides of the shoe at the same time.

16. A machine for tightening the upper of a welted shoe adjacent to the ends of the welt, having means arranged at opposite sides of the shoe for entering the welt crease, means for engaging the upper side of the welt, mechanism for actuating said means to force the upper at the two sides of the shoe inwardly at the same time and hold it, and mechanism for fastening the upper while it is so held.

17. A machine for use in making shoes having manually controlled means for engaging shoe stock in the welt crease on opposed sides of the shoe and forcing it inwardly over the edge of a last, fastening inserting means movable inwardly with said engaging means, and power driven means for causing the insertion of fastenings after the upper has been tightened.

18. A machine for use in making shoes, having means for engaging shoe stock on opposed sides of the shoe and forcing it inwardly over the edge of a last, fastening inserting means movable inwardly with said engaging means, and connected mechanism under control of the operator for effecting and controlling the inward movement of the engaging means and for starting the power driven means.

19. A machine for tightening the upper of a welted shoe adjacent to the ends of a welt, having means constructed and arranged for movement to engage the shoe stock on opposed sides of the shoe and to adapt themselves automatically to the size and shape of the shoe, and actuating mechanism therefor to cause the upper to be forced over the edge of the last and held in position to be secured.

20. A machine for tightening the upper into lasted position adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising means constructed and arranged to engage the flange at opposite sides of the shoe and to adapt themselves automatically to the size and

shape of the shoe, actuating mechanism therefor, and fastening inserting means movable with said engaging means into inserting relation to the tightened upper.

21. A machine for tightening the upper adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising means for positioning the shoe, devices constructed and arranged to engage flange at opposite sides of the shoe, means for actuating the engaging devices outwardly and also upwardly to strain the upper, and means for inserting fastenings to secure the upper at the two sides of the shoe.

22. A machine for tightening the upper adjacent to the ends of the heel stiffener of a shoe having an outturned flange, comprising means for supporting the shoe, devices constructed and arranged to engage the shoe stock at opposite sides of the shoe for forcing the upper inwardly over the edge of the last, and means for effecting vertical compression of the heel seat end portion of the shoe bottom.

23. A machine for tightening the upper of a welted shoe into lasted position adjacent to the rear end of the inseam, comprising means for engaging the shoe stock to force the upper over the edge of the last, and means for compressing the stock at the rear end of the inseam to shape the heel seat end of the shoe bottom.

24. A machine for use in making shoes, comprising means constructed and arranged to tighten an upper over a last edge adjacent to the end of the heel stiffener, and means for leveling that portion of the bottom of the lasted shoe over which the breast portion of the heel is to be applied.

25. A machine for use in making shoes, comprising means constructed and arranged to tighten an upper over a last edge adjacent to the two ends of the heel stiffener, and means for leveling the heel seat portion of the shoe bottom while the upper is held tightened.

26. A machine for use in making shoes, comprising means constructed and arranged to tighten an upper over a last adjacent to the end of the heel stiffener, means for effecting compression of the shoe in a direction perpendicular to the bottom thereof and in the region over which the breast portion of the heel is applied, and means for inserting a fastening to secure the upper.

27. A machine for tightening the upper of a welted shoe into lasted position adjacent to the rear ends of the inseam, comprising means for engaging the shoe stock to force the upper over the edge of the last, means for leveling the rear end portion of the inseam while the upper is held, and means for securing the upper.

28. A machine for use in making shoes, having means for engaging the upper adjacent to the ends of the heel stiffener to tighten it over the last, means for overlaying the shoe bottom adjacent to the ends of the stiffener, means for relatively moving said latter means and the shoe to effect compression of the stock of the shoe bottom, and means for inserting fastenings to secure the upper.

29. A machine for use in making shoes having an outturned flange, comprising means for engaging the upper under the flange and means for engaging the upper side of the flange whereby the upper may be forced upwardly and inwardly to tighten it about the last, and means for relatively moving said last-named engaging means and the last to compact the upper on the last bottom.

30. A machine for use in making shoes having an outturned flange, comprising means for engaging the upper under the flange at either side of the shoe, means arranged to extend over the flange, means for relatively moving the shoe and the engaging means to tighten the upper, and means for relatively moving the shoe and the means extending over the flange to compress the stock on the shoe bottom.

31. A machine for use in making shoes having an outturned flange, comprising devices arranged at either side of the shoe to extend under the flange, coöperating devices to extend over the flange and inwardly over the shoe bottom, means for actuating said devices to press and wipe the shoe stock inwardly from opposite sides of the shoe simultaneously, and means for relatively moving the shoe and said devices to compress the stock of the shoe bottom vertically.

32. A machine for use in making shoes having an out-turned flange, comprising devices arranged at either side of the shoe to extend under the flange, coöperating devices to extend over the flange and inwardly over the shoe bottom, means for actuating said devices to press and wipe the shoe stock inwardly from opposite sides of the shoe simultaneously, means for relatively moving the shoe and said devices to compress the stock of the shoe bottom vertically, and means for fastening the upper in its inwardly pressed position while it is held by said devices.

33. In a machine for use in making shoes, means constructed and arranged to engage a shoe in the welt crease for tightening an upper over the edge of a last adjacent to the end of the heel stiffener, combined with automatically operated mechanism for compressing the stock of the shoe bottom in the direction of its thickness and securing the upper in its tightened relation to the last.

34. In a machine for use in making shoes, means for tightening an upper over the edge

of a last adjacent to the ends of the heel stiffener simultaneously at the opposite sides of the last, combined with automatically operating mechanism for leveling the shoe bottom and fastening the upper in its tightened relation to the last.

35. A machine for use in making shoes, comprising a shoe support, a presser for engaging the side of the shoe, a wiper to extend over the shoe bottom, and automatically operated mechanism for compressing the overworked marginal portion of the upper and the innersole of the shoe between said support and wiper and for driving tacks.

36. A machine for use in making shoes, comprising a shoe support, pressers arranged to engage each side of the shoe adjacent to the ends of the heel stiffener, wipers to extend over the shoe bottom, actuating mechanism to cause said devices to tighten the upper, and automatically operated mechanism for compressing the stock of the shoe bottom and inserting a plurality of fastenings through the compressed stock simultaneously.

37. A machine for use in making shoes, comprising a shoe support, pressers arranged to engage each side of the shoe adjacent to the ends of the heel stiffener, wipers to extend over the shoe bottom, actuating mechanism to cause said devices to tighten the upper, and automatically operated mechanism for compressing the stock of the shoe bottom and inserting a plurality of fastenings through the compressed stock simultaneously.

38. A machine for use in making shoes, comprising means for engaging the shoe stock at opposite sides of a lasted shoe adjacent to the ends of the heel stiffener and tightening it over the last bottom, and means for driving fastenings simultaneously at the two sides of the shoe in directions to cause the tacks to exert an inward draft on the upper and to clench away from the edge of the shoe.

39. A machine for use in making shoes, comprising means for forcing inwardly the upper on a shoe bottom from opposite sides of the shoe simultaneously, and means operated automatically to compact the upper on the shoe bottom and drive fastenings simultaneously in directions inclined inwardly from the two sides of the shoe.

40. A machine for use in making shoes, comprising means arranged to engage the side of the shoe adjacent to the end of the heel stiffener, actuating means for causing the area of engagement to spread toward the edge of the last whereby the upper is worked upwardly on an inverted last, means for forcing the upper over the edge of the last, and means for securing the upper upon the shoe bottom.

41. A machine for use in making shoes, comprising means arranged to engage the side of the shoe adjacent to the end of the heel stiffener, actuating means for causing the area of engagement to spread toward the edge of the last whereby the upper is worked upwardly on an inverted last, means for forcing the upper over the edge of the last, means operated automatically to compress the stock of the shoe bottom, and means for securing the upper.

42. A machine for use in making shoes, comprising means arranged to engage the side of the shoe adjacent to the ends of the heel stiffener, actuating means for causing the contact of said engaging means with the upper to progress toward the edge of the last on the two sides of the shoe simultaneously, means for working the upper over the edge of the last, and means operated automatically for shaping the stock on the last bottom to form a seat for the outersole.

43. In a machine for use in making shoes, connected mechanism for tightening an upper of a lasted and welted shoe over the edge of the last, compressing the stock of the shoe bottom and fastening the upper.

44. A machine for use in making a shoe having an outturned flange, comprising connected mechanism for engaging the shoe stock at the flange to tighten the upper over the edge of the last, compressing the shoe stock on the last bottom, and fastening the upper.

45. A machine for use in making a shoe having an outturned flange, comprising connected mechanism for engaging the shoe stock at the flange on the two sides of the shoe to tighten the upper over the opposite edges of the last simultaneously and for inserting fastenings to secure the upper.

46. In a machine for use in making shoes, connected mechanism constructed and arranged to engage the shoe stock adjacent to the ends of the heel stiffener on opposite sides of the shoe simultaneously to tighten the upper over the edge of the last, to compress the shoe stock for forming a seat for the outersole, and to insert fastenings at the two sides of the shoe at the same time for securing the upper.

47. A machine for use in making shoes, comprising plates arranged for movement inwardly over the end portions of the inseam and heel stiffener, and automatically operated mechanism for effecting compression of the portion of the shoe bottom covered by said plates and for inserting tacks in the shoe bottom.

48. A machine for use in making shoes, comprising means arranged for movement inwardly over the end portion of the inseam and heel stiffener, mechanism for effecting relative movement of said means and the shoe to compact the inseam and

heel stiffener against the innersole, and means for inserting fastenings into the shoe stock while it is held under compression.

49. In a machine of the class described, a resilient heel embracing band having its end portions split lengthwise to form separate tongues and a pad supported by and bridging said tongues at each end of the band.

50. In a machine of the class described, a resilient heel embracing band formed to present normally the lower edges of its opposite end portions nearer together than its upper edges, pads secured to said end portions, and actuating means constructed and arranged relatively to the band to close the lower edge portions of the pads first against the shoe and then bend the band to cause the points of engagement to progress toward the upper edges of the pads.

51. In a machine of the class described, a resilient heel embracing band formed to present normally the lower edges of its opposite end portions nearer together than its upper edges, pads secured to said end portions, means for closing the pads against the shoe, and other means for forcing inwardly the upper edges of the pads to clamp the edges of the shoe.

52. In a machine of the class described, a resilient heel embracing band and actuating mechanism therefor, including relatively yielding devices respectively connected with the body of the band adjacent to the end portions and operatively engaged with the upper edge of the band.

53. In a machine of the class described, a resilient heel embracing band and actuating mechanism therefor, including relatively yielding devices respectively connected with the body of the band adjacent to the end portions and operatively engaged with the upper edge of the band, said machine having provision for causing the upper edges of the band to be forced into clamping position after the body of the band.

54. A machine of the class described, having a wiper arranged for movement over the shoe bottom, a presser arranged to engage the shoe stock in the welt crease and inclined upwardly toward the wiper, combined with suitable actuating means.

55. A machine of the class described, having a wiper arranged for movement over the shoe bottom, a presser arranged to engage the shoe stock in the welt crease and inclined upwardly toward the wiper, and means for actuating the wiper inwardly over the shoe bottom while yieldingly actuating the presser inwardly and upwardly against the inseam in the welt crease.

56. A machine of the class described, having a wiper to engage the shoe stock on the last bottom, a presser to engage the shoe stock in the welt crease, and means for clamping the shoe stock to the side of the last at and adjacent to its edge.

57. A machine of the class described having, in combination, the wide thin edged blade 50 mounted for engagement in the welt crease at the rear of the shank of a welted shoe to tighten the upper materials at the end of the inseam and hold them while they are being fastened, and a support upon which said blade is mounted for limited rotary movement about an axis that is substantially perpendicular to the side face of the shoe to permit the blade to adapt itself to the spring of the shoe edge.

58. A machine of the class described, having means for gathering slack from the side of the shoe and forcing it to the edge of the last at the opposite sides of the shoe, means for engaging the shoe stock at the ends of the inseam to tighten it over the last, and means for fastening the upper while it is held.

59. A machine of the class described, having means engaging the shoe stock at the inseam to tighten it over the edge of a last, means for effecting compression of the shoe stock against the last bottom, and means for inserting tacks while the upper is under compression.

60. In a machine of the class described, a heel embracing band constructed and arranged to clamp the shoe stock to the last at and adjacent to the ends of the heel stiffener, means arranged at opposite sides of the last to wipe the correspondingly located portions of the shoe stock over the last bottom, and connected operating mechanism for said two seams.

61. In a machine of the class described, a heel embracing band constructed and arranged to clamp the shoe stock to the last at and adjacent to the ends of the heel stiffener, means arranged at opposite sides of the heel of a last to force correspondingly located portions of the shoe stock over the edge of the last, means for inserting tacks to secure the upper, and connected mechanism for actuating said two means constructed and arranged to allow the operator to inspect the work before the tacks are driven.

62. In a machine of the class described, means arranged at opposite sides of a last to force correspondingly located portions of the shoe stock over the edge of the last, means for inserting tacks to secure the upper, and connected mechanism for actuating said two means constructed and arranged to permit a plurality of partial operations of the machine for forcing the upper into position before the tack inserting devices are actuated.

63. In a machine of the class described, means arranged at opposite sides of a last to force correspondingly located portions of

the shoe stock over the edge of the last, means for inserting tacks to secure the upper, and mechanism for actuating said two means constructed and arranged to permit the upper manipulating means to be operated without necessarily actuating the tack inserting means.

64. A machine of the class described, having a presser to engage a shoe in the welt crease, a wiper to engage the opposed side of the welt, and means for actuating the presser and wiper to force the upper over the last.

65. In a machine of the class described, a resilient heel embracing band, a pad carried by each end of the band and arranged to engage the side of the shoe at and adjacent to the front end portion of the heel stiffener, means for actuating the band to cause the pads to clamp the shoe stock against the side of the last, and other means for actuating the pad to clamp the shoe stock against the edge of the last.

66. In a machine of the class described, a heel embracing band, and means for supporting the band, comprising the rod 28 having two relatively movable parts, the spring for pressing the band forwardly, and means for adjusting the rear part for the purpose described.

67. In a machine of the class described, a back gage comprising an abutment, a carrier therefor, having two sections constructed and arranged to permit a limited amount of relative endwise movement, a spring for holding the abutment carrying section projected to the limit of said relative movement, a support, and means arranged to permit adjustment of the other section in the support.

68. In a machine of the class described, a heel embracing band and operating mechanism therefor, comprising an actuator, the bell cranks 15 having yielding connection with the end portions of the band, and connections including the screw-threaded shafts 10 with the actuator.

69. In a machine of the class described, a heel embracing band, a tacking mechanism, a treadle, a connection from the treadle to the band to cause the latter to clamp the upper to the last, and a connection to the tacking mechanism to cause the latter to be operated for forcing the upper over the last bottom and securing it.

70. A machine of the class described, having wipers arranged for movement from opposite sides of the heel over the last bottom, means for effecting vertical compression of the shoe stock between the wipers and the last bottom, and power driven means for inserting tacks.

71. A machine of the class described, having wipers arranged for movement from opposite sides of the heel over the last bottom, means for effecting vertical compression of the shoe stock between the wipers and the last bottom, and power driven means for inserting tacks, said machine having provision for permitting repeated movements of the wipers without necessarily actuating the tack inserting means.

72. A machine of the class described, having wipers arranged for movement from opposite sides of the heel over the last bottom, and means for effecting vertical compression of the shoe stock between the wipers and the last bottom, said machine having provision for pressing the wipers inwardly during said vertical compression.

73. A machine of the class described, having unyielding wipers arranged for movement from opposite sides of the heel over the last bottom, and connected mechanism for simultaneously raising the shoe against the wipers and pressing the wipers inwardly.

74. A machine of the class described, having means for tightening the shoe stock over the last bottom at and adjacent to the two end portions of the heel stiffener simultaneously, means for compressing the shoe stock against the last bottom at and adjacent to the location of the heel breast, and means for securing the stock while it is under compression.

75. A machine for use in making shoes, having means for tightening the shoe stock over the bottom of a lasted shoe, means for determining the position of the shoe longitudinally in the machine, and automatically driven mechanism for compressing and securing the stock at and adjacent to the location of the heel breast line of the shoe.

76. A machine for use in making shoes, having substantially unyielding means formed to cover a small portion of the length of a welted shoe, and means to actuate it for tightening and leveling the shoe stock of the inseam on the two sides of a shoe at and adjacent to the location of the heel breast line of the shoe.

77. A machine for use in making shoes, having automatically operating means for forcing inwardly over the last bottom, compressing and securing the shoe stock of the inseam on the two sides of the shoe simultaneously at and adjacent to the location of the heel breast line of the shoe.

78. In a machine of the class described, the combination with suitable actuating mechanism, of a shoe support, and means cooperating therewith to compress and level the shoe stock of the end portions of the inseam at and adjacent to the heel breast line of the shoe, said machine having means to position the shoe with the inseam ends in appropriate relation to said last named means to receive the action thereof.

79. A machine of the class described, hav-

ing means for engaging a lasted and welted Goodyear welt shoe below the welt for tightening the upper over the last, means for securing the upper, and means for actuating the forcing means and causing the actuation of the securing means, said machine having provision for effecting an additional movement of the forcing means when the securing means is caused to operate.

80. A machine of the class described, having means for forcing an upper over a last, power driven mechanism for securing the upper, and means under control of the operator for actuating the forcing means and starting said power driven mechanism, said machine having provision for causing a further pressure by the power upon the forcing means when the securing means is operated.

81. A machine for use in making shoes having a presser to tighten an upper over a last, a wiper, means for relatively actuating the wiper and last to compress the stock between them, and means for retracting the presser in predetermined time relation to the compressing movement.

82. A machine for use in making shoes having means for pressing the upper over a last, means for compressing the upper upon the last bottom, and means for automatically withdrawing the first mentioned means during the operation of the compressing means.

83. A machine for use in making shoes having a presser, manually operated means for advancing the presser over the shoe bottom and power operated means for retracting the presser.

84. A machine for use in making shoes having a presser, manually operated means for advancing the presser over the shoe bottom, a yielding connection between the presser and said means, and automatically operated mechanism for retracting the presser with relation to its manually operating means.

85. A machine for use in making shoes having a presser, a tacker, means for advancing the presser, means for actuating the tacker and connections for retracting the presser during the tack driving operation.

86. A machine for use in making shoes having devices for working an upper over the edge of a last, means for driving tacks to secure the upper and mechanism for automatically actuating the tack driving means and moving the overworking devices in a direction reverse to their overworking movement preliminary to the insertion of the tacks.

87. A machine for use in making shoes having, in combination, devices which clasp the heel portion of a shoe and force the upper materials to the last at the sides of the heel and over the last bottom, means for inserting fastenings to secure the upper in such condition, power driving mechanism for said means, a manually operated treadle and connections for so actuating said devices to clasp the heel and to force the upper over the last bottom and thereafter connecting said fastening means to its power driving mechanism.

88. A machine for working upon a lasted and welted shoe, comprising means for engaging the shoe stock to tighten the upper over the edge of the last at the rear end of the inseam, means for leveling the rear end portion of the inseam, and means for securing the rear end portion of the welt.

89. A machine of the class described, having means for engaging a lasted and welted shoe to tighten the upper inwardly over the edge of the last at the rear end of the inseam, means to secure the upper, and means including a support for the shoe to compress the stock upon the last bottom at the rear end of the inseam.

90. A machine of the class described, having in combination, a shoe support or holder, means for working into lasted position the upper of a welted shoe adjacent to the end of the inseam, said means being constructed and arranged to engage the shoe between the upper and welt to tighten the upper about the last, and means for securing the upper while it is held in tightened condition.

91. A machine of the class described having, in combination, short thin blades or plates arranged to act locally at the front end of the heel seat of a shoe to force the upper and the flange of the heel stiffener ends into lasted relation to the innersole lip, and means for actuating said plates at the two sides of the shoe simultaneously in opposite directions transversely of the shoe and without substantial movement lengthwise of the shoe.

92. A machine of the class described having, in combination, plates to engage an upper at the opposite sides of a shoe to tighten it over the last edge toward the lip of the innersole, means arranged to clamp the stock from above to hold it from retraction until it is fastened while the plates are withdrawn, said machine being arranged for withdrawal of said plates prior to the fastening of the upper.

93. A machine of the class described having, in combination, wiper plates to tighten an upper over the edge of a last, mechanism to apply fastenings to secure the upper, means for relatively moving the shoe and a member that is associated with said fastening applying mechanism to compress and flatten the stock upon the last bottom, and means for withdrawing the wiper plates while the upper is held by said mechanism and before the application of the flattening compression.

94. A machine of the class described having, in combination, wiper plates to tighten an upper over the edge of a last, means for manually operating said plates, upper securing mechanism, and means for automatically retracting the wiper plates in time relation to the operation of the securing mechanism.

95. A machine of the class described having, in combination, opposed wiper plates 50, connections to a manually operated device for actuating them, a power driven tacker and heel seat compressor, and means for retracting the wiper plates in time relation to the operation of the tacker and compressor.

96. A machine of the class described having, in combination, a wiper plate to tighten an upper over the edge of a last, and a member arranged to engage the upper in advance of the edge of the wiper and hold it in tightened condition, and mechanism to retract the wiper and insert securing tacks while the upper is so held.

97. A machine of the class described having, in combination, a wiper plate to tighten an upper over the edge of a last and a member arranged in a plane above the wiper and with relation to which there is relative inward and outward movement and which is adapted to engage the upper in advance of the acting edge of the wiper and hold it while the wiper is retracted.

98. A machine of the class herein described having, in combination, means for supporting a lasted and welted shoe, means arranged to engage in the crease between the upper and the welt adjacent to its end to tighten the upper, and means to fasten the upper.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EUGENE L. KEYES.

Witnesses:
ARTHUR L. RUSSELL,
BERTHA M. HUTCHINSON.

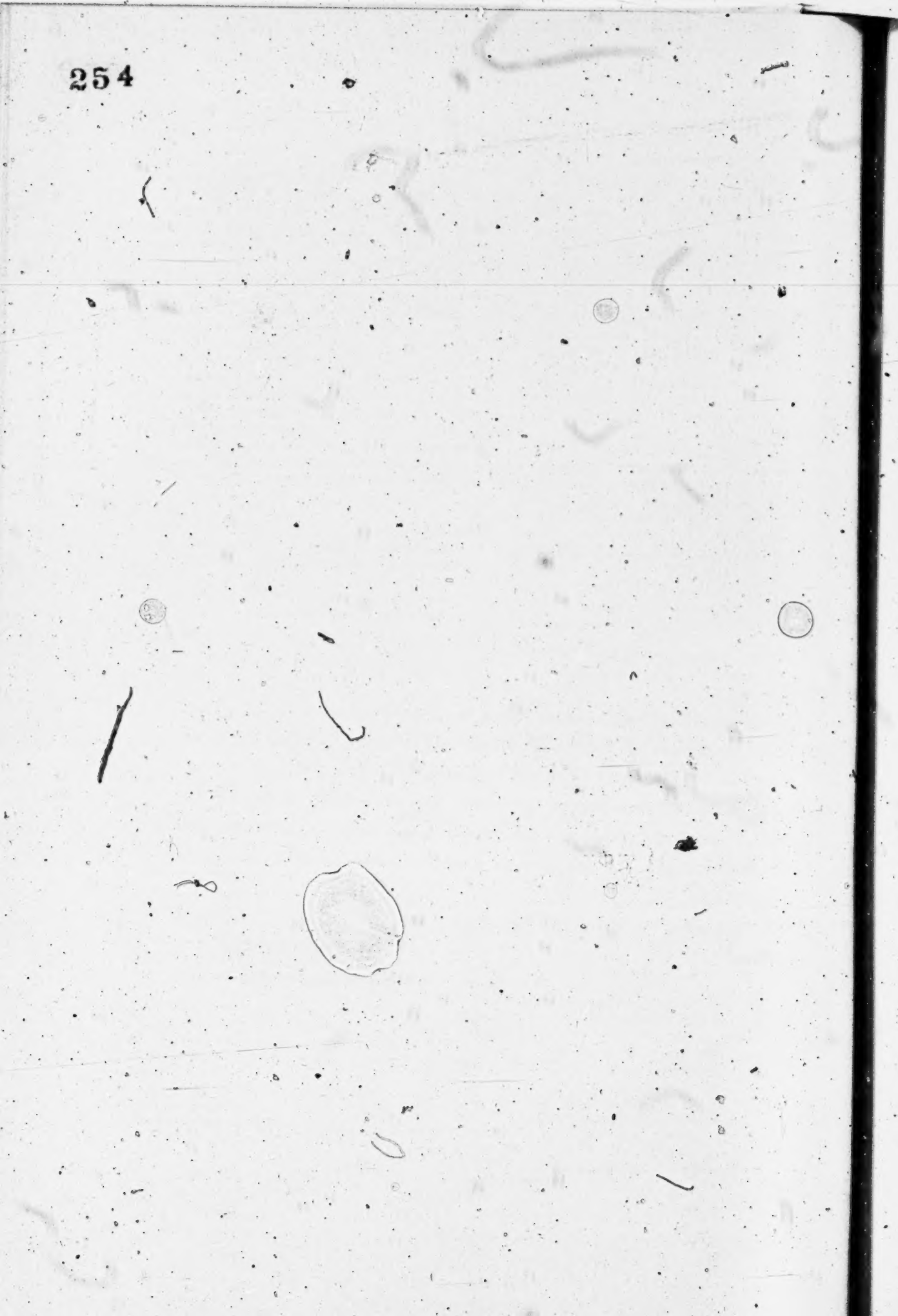
Correction in Letters Patent No. 1,023,854.

It is hereby certified that in Letters Patent No. 1,023,854, granted April 23, 1912, upon the application of Eugene L. Keyes, of Boston, Massachusetts, for an improvement in "Machines for Use in the Manufacture of Shoes," an error appears in the printed specification requiring correction as follows: Page 10, line 103, for the word "seams" read *means;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of May, A. D., 1912.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.



256

A. A. MACLEOD.

LASTING MECHANISM.

APPLICATION FILED NOV. 8, 1911.

1,030,519.

Patented June 25, 1912.

Fig. 1.

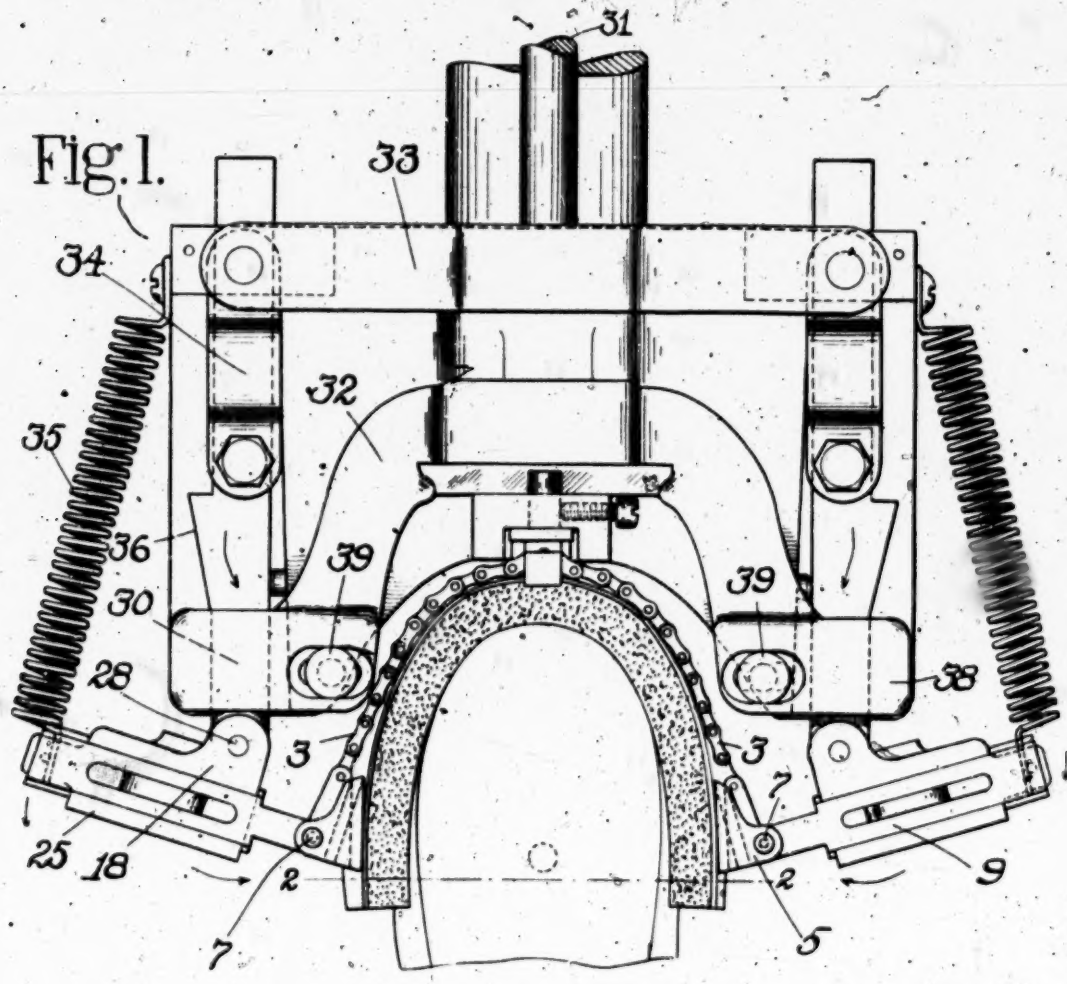


Fig. 2.

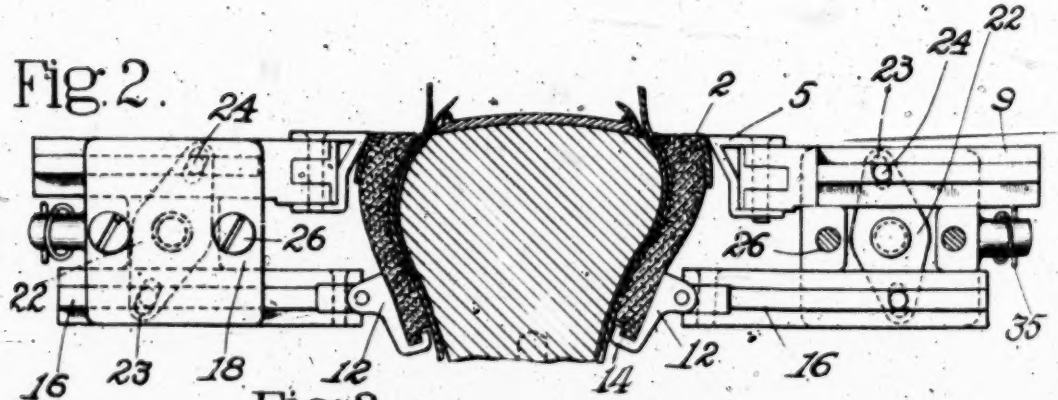
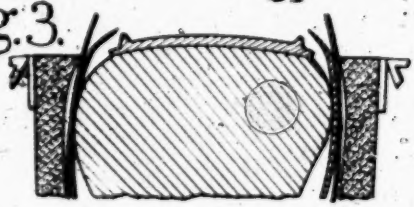


Fig. 3.



WITNESSES

Elizabeth C. Coope

Mary E. Mendenhall

INVENTOR.

Albert A. Macleod

By his Attorney

Edward M. Howard

UNITED STATES PATENT OFFICE.

ALBERT A. MACLEOD, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

LASTING MECHANISM.

1,030,519. Specification of Letters Patent. Patented June 25, 1912.

Application filed November 8, 1911. Serial No. 659,181.

To all whom it may concern:

Be it known that I, ALBERT A. MACLEOD, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented certain Improvements in Lasting Mechanisms, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to lasting machinery of the "bed" type and is herein shown as embodied in the heel lasting mechanism of United States Letters Patent No. 1,002,818, granted September 12, 1911 on application of Matthias Brock.

The object of this invention is to secure more effective lasting, or conformation of the shoe stock to the contour of the last, of the sides of the shoe end and particularly of the heel end. The conformation of the shoe stock to the sides of the heel portion of the last is effected in the bed type of machine largely by the heel band.

By prior inventions the heel band has been actuated to clamp the upper materials snugly about the last at its upper edge to coöperate with the wipers or lasting plates that go over the shoe bottom to form the upper correctly at the edge of the shoe. As heretofore used these bands do not, however, adequately clamp the upper materials to the last below the edge of the shoe and along the upper edge of the heel stiffener. This portion of the stiffener, and the upper leather outside it, has therefore not been conformed closely to the last but has in many instances stood away from the last more or less and the completed shoe has not only been lacking in the shape or outline that its designer and the last maker intended it to have but it has failed to clasp or hug the heel portion of the wearer's foot as it should do and, if an "Oxford" shoe or a "pump," it has often slipped up and down on the heel in an objectionable way.

A feature of this invention is found in the provision of end band actuating mechanism which will cause a band to embrace the end portion of a shoe snugly at a distance removed from the edge of the shoe as, for example, which will cause a heel band to clamp the upper and stiffener against the sides of the heel along the upper edge of the stiffener.

Another feature of this invention consists in the combination with end band closing mechanism, of additional means to force hard against the sides of the last the edge of the band which is remote from the sole face of the shoe.

A further feature of the invention consists in the combination with known band closing mechanism of devices arranged to be actuated therefrom and to force the lower edge of the band to clamp the underlying portions of the upper and heel stiffener to the sides of the heel portion of the last.

Advantageously, and as herein shown, the new clamping devices are connected by equalizers with the closing mechanism so that said devices and mechanism may adapt themselves automatically to different contours of last sides.

These and other features of the invention, including certain details of construction and combinations of parts will be hereinafter described and pointed out in the claims.

Figure 1 is a plan view, partially broken away, of the heel head of a lasting machine of the type referred to; Fig. 2 is a vertical section on the line 2—2 of Fig. 1 looking rearwardly after the band has been closed; and showing the cover plate removed on the right of said figure. Fig. 3 is a contrasting view before the band is closed.

The heel lasting mechanism in general and the known band closing mechanism in particular may be like that shown in said Brock patent where the heel band 2 is embraced by a chain 3 which is connected by end pieces 5 to chain arms 9 by pivot pins 7. The chain arms 9 are carried in blocks or levers 18 that are pivoted at 28 to slide bars 30, and have their outward extensions engaged by contractile springs 35 which tend to pull the band forwardly about pivots 28. The bars 30 are connected by links 34 to the cross head 33 of a plunger 31 from which power is applied to carry the chain arms bodily forward and, when the shoe resists further movement in that direction, to force the blocks 18 to turn about pivots 28 in the direction to press the band ends inwardly. This inward movement of the band ends is supplemented by wedge faces 36 on the slide bars 30 which, in the

forward movement of said bars, engage abutments 38 and wedge the band ends toward the shoe sides. The abutments 38 are formed on an equalizing yoke 32 which can slide transversely of the machine by slots and pins 39 to provide the same pressure on each side of differently shaped lasts.

With the aforesaid closing mechanism I have combined devices for clamping the lower edge of the band to the sides of the heel and for this purpose each block 18 is formed with a guideway in which the chain arm 9 can slide endwise. The block is also provided with a lower guideway in which a new arm 16, pivotally connected by a head piece 12 to the lower edge of the band, is also mounted to slide endwise. The block is recessed to receive the lever 22 which is fulcrumed to it and has in the ends of its upper and lower arms slots 23 by which it has engagement with studs 24 on the bars 9 and 16 for actuating both said bars. By reason of its fulcrum connection with the block 18 the lever actuates the two bars in proportion to the length of its arms and furthermore permits relative adjusting or self-adapting movements of the arms 9 and 16 for lasts of different shapes. The head piece 12 has a hook 14 by which it engages under the band and in a recess in the inner face of the band so that it can move the band edge outwardly as well as inwardly. A cover plate 25, secured by screws 26, confines the arms 9 and 16 and the equalizer lever 22 within the block 18.

In the use of the heel lasting mechanism equipped with the invention the band closing mechanism operates as described in said patent with this addition, that the band closing pressure is transmitted by the block 18 through the lever 22 and arm 16 to the lower portion of the band as well as to its upper edge portion and the lever acts as an equalizer to close the lower portion of the band about the narrow part of the heel and there to apply clamping pressure equally to both lower and upper portions of the band ends.

Having explained the invention and described how it may be used, I claim as new and desire to secure by Letters Patent of the United States:

1. An end lasting mechanism having, in combination, an end embracing band, closing mechanism having engagement with the end portions of the band near its upper edge, and additional closing devices having engagement with the end portions of the band near its lower edge.

2. An end lasting mechanism having, in

bination, an end embracing band, clos-
mechanism having engagement with the
portions of the band near its upper
e, and separate devices connected with
l mechanism and with the end portions
he band near its lower edge to cause said
d to clamp the heel stiffener to the last
ts edge remote from the last bottom.

. An end lasting mechanism having, in
bination, an end embracing band, clos-
mechanism having engagement with the
portions of the band near its upper
e, a separate point of engagement with
band near its lower edge, and an equal-
through which force is applied to con-
n the band widthwise to the contour of
side of the last and clamp the shoe by
n edges of the band.

An end lasting mechanism having, in
bination, an end embracing band, clos-
mechanism having engagement with
end portions of the band near its up-
edge, and comprising a chain arm con-
ed with the upper edge of the band; a
nd arm connected with the lower edge
he band, a block in which the arms are
ded to slide endwise, and an equalizer
necting said arms to each other and to
block.

An end lasting mechanism having, in
bination, an end embracing band, clos-
devices connected with the upper and
n the lower parts of the band ends, an
ator for said devices, and an equalizer
necting said devices together and to the
ator for the purpose described.

A heel lasting mechanism comprising
el embracing band and closing mecha-
therefor connected with the upper
of the band ends, in combination with
ns for applying band closing pressure
ne lower parts of the band ends.

A heel lasting mechanism having, in
bination, an end embracing band, a clos-
device arranged to press against the up-
part of the band end, and a second clos-
device formed to hook under the lower
of the band and up into the band for
rding support and outward actuation
he band end, and means for applying
ng pressure to the band end through
of said devices.

n testimony whereof I have signed my
e to this specification in the presence
wo subscribing witnesses.

ALBERT A. MACLEOD.

itnesses:
ARTHUR L. RUSSELL,
HERBERT W. KENWAY.

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E. BAYARD, DEC'D.
A. A. BAYARD, EXECUTRIX.
TOE WIRING DEVICE.
APPLICATION FILED OCT. 30, 1911.

1,068,843. Patented July 29, 1913

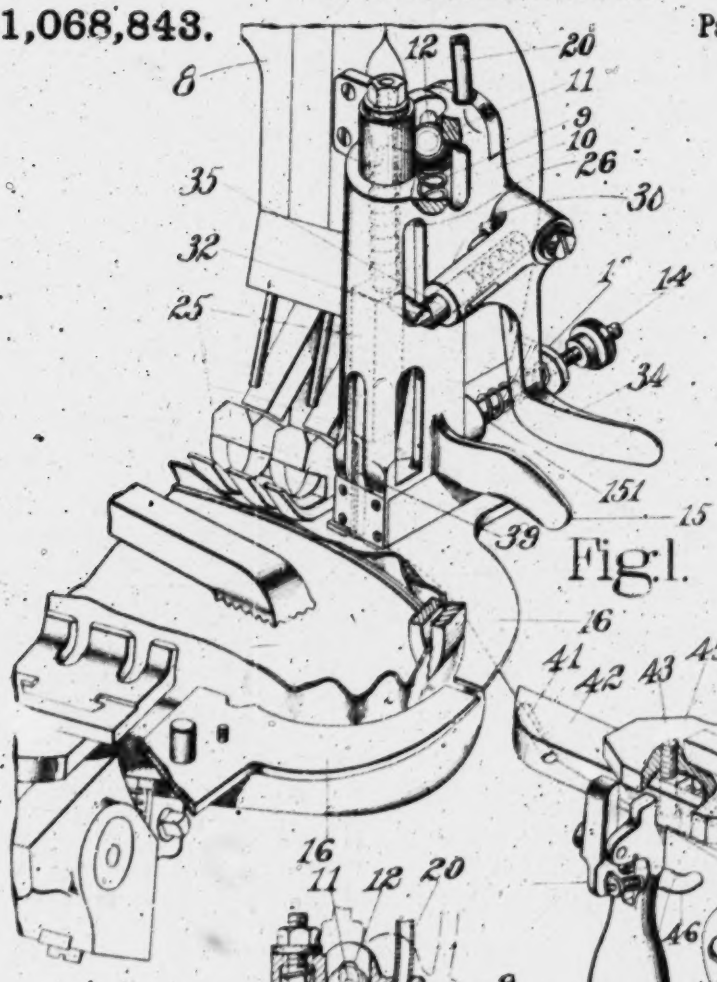
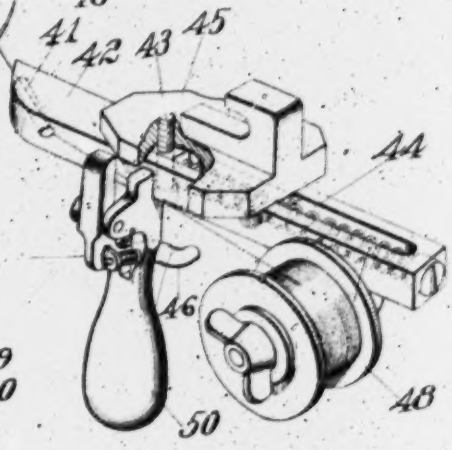


Fig. 1.



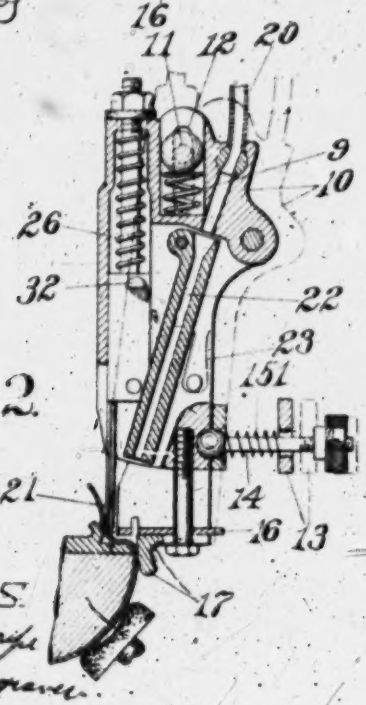


Fig. 2.

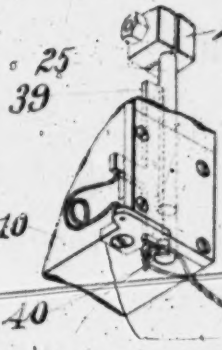


Fig. 3.

WITNESSES:
Elizabeth C. Cox
Blanche Hargrave

INVENTOR:
Amanda A. Bayard, Executrix
of the Will of Edwy Bayard
Deceased
By her Attorneys Glascock & Howard

UNITED STATES PATENT OFFICE. 261

EMERY BAYARD, DECEASED, LATE OF ROCHESTER, NEW YORK, BY AMELIA A. BAYARD, EXECUTRIX, OF ROCHESTER, NEW YORK, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TOE-WIRING DEVICE.

1,068,843. Specification of Letters Patent. Patented July 29, 1913.

Original application filed June 17, 1910, Serial No. 567,529. Divided and this application filed October 30, 1911. Serial No. 657,538.

To all whom it may concern:

Be it known that EMERY BAYARD, deceased, late of Rochester, in the county of Monroe and State of New York, invented certain Improvements in Toe-Wiring Devices, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to shoemaking machines and particularly to apparatus for temporarily securing upper material in lasted position, this application being a division of application Serial No. 567,529 filed June 17, 1910, for machines for use in the manufacture of boots and shoes. By the machine illustrated in that application the upper is pulled over a last and the toe portion of the upper is worked into lasted position over the bottom of the shoe and secured with the aid of the toe binding device herein shown. In that application are to be found the claims for the various combinations of the overworking means and the toe binding device, the claims for said binding device *per se* being made in this application.

A feature of this invention is to be found in means for carrying a wire around the toe of the shoe to bind the upper in lasted position. In the illustrated embodiment of this invention the wire carrier is mounted for manual operation. It is also arranged so that it can be used to bind one corner of the toe after the upper has been overworked, as by one wiper, and can thereafter be further actuated to bind in the other corner when that is ready to be secured. This binding device is also equipped with a tension device by which the wire can be held taut in position to secure one corner of the upper while the other corner is being lasted. The tension device includes means arranged to be engaged by one finger of that hand of the operator by which the carrier is being moved whereby the tension can be increased or diminished as the binding or the placing of the wire proceeds about the toe. As advised it is new by this invention to provide for varying the tension as the wire carrier moves to place a binder about the toe of a shoe. In accordance with the illustrated embodiment of this invention, a reel for holding a supply of wire is mounted on and movable with the wire placing device so that excess of wire is not drawn off, as it would be from a stationary reel, when the device reaches backwardly to carry the binder into position to be anchored; also a spring is arranged to return the wiring device to an out of the way position while it is not in use. These and other features of this invention including certain details of construction and more important combinations of parts will be explained in the following description of a preferred embodiment of the invention and will then be pointed out in the claims.

Figure 1 is a perspective view of the wire carrying means and the associated parts; Fig. 2 is a sectional view illustrating some of the associated parts which prepare the shoe for the application of the wire and may anchor the wire; Fig. 3 is a perspective view from a different angle of the means for anchoring the end portion of the wire held by the wire carrier.

The invention is herein shown for the purpose of explanation as applied to a machine like the well-known commercial pulling-over machine shown and fully described in United States Letters Patent No. 1,029,387 granted June 11, 1912, and in British Patent No. 12,304 of 1903 corresponding thereto. It is not necessary herein to show, or to describe, that machine and its operation except in those particulars in which it coöperates with the lasting devices of the present invention, which are arranged to operate after the shoe upper has been pulled and adjusted upon the last and while the shoe is held in the machine with the upper under tension over the last, the power driven mechanism of the machine being temporarily at rest. It is contemplated that the machine shall be organized to come to rest with the side clamps closed against the sides of the shoe and the automatically actuated inswinging tack carrying arms 8 at the sides of the machine in their tack inserting positions over the shoe.

In the embodiment of the invention first to be described an attachment, shown in Fig. 2 is loosely applied to each side tack arm 8. The body portion of the attachment is indicated at 10, Fig. 2, and the con-

nection with the arm is made by a ball headed pin 11 which projects from the tack arm through a slot 12 into a spring chamber in the upper portion of body 10. The slot, ball and spring 9 allow sufficient play to permit the attachment to be moved, as will be suggested, automatically and by the handle 15. The lower portion of the body 10 is connected yieldingly to the automatically moved arm 8 by a rod 14 and an ear 13 which acts through a spring 151 to hold the lower end of the attachment tilted inwardly relatively to the tack arm. In this relative position the attachment approaches the shoe with the arm 8 and rides over the shoe bottom until it is stopped by an abutment and then the upper portion of the attachment 10 is carried forwardly, its lower face fulcrums on the edge of the shoe bottom, the spring 151 yielding if necessary to allow this movement, and the inner edge of the attachment, or of the wiper 16 carried thereon, tips downwardly to compress the upper down upon the feather of the shoe innersole and into the angle between the feather and the lip or shoulder of the innersole where it should be secured.

The body 10 supports the curved lasting plate 16 which has an inner acting edge shaped to fit the corner of the shoe approximately and to extend forwardly toward the middle of the toe. The lasting plate is carried automatically by its carrying arm 8 transversely of the shoe into approximate lasting position over the shoe bottom. By means of the handle 15 the operator further moves the plate 16 as may be required for forcing the upper into lasted position over one corner of the last, the loose connection 12 with the tack arm permitting sufficient freedom of manual movement transversely of the shoe and also rotatively for this purpose and also permitting enough vertical movement to enable the desired downward pressure upon the upper to be effected for molding it into lasted position upon the innersole. The two independent plates 16 of the two attachments permit separate lasting of the two corners of the toe. This arrangement also allows conformation to the differences found in the toe portions of right and left crooked lasts.

The tack driver of the prior machine is omitted from the front tack arm and, in place of the usual tack conductor tube leading thereto, two tubes 20 are diverted from the automatically operated multiple tack supplying apparatus of the machine and led to the attachments 10 at either side of the machine. Each attachment is provided with a tack pocket 21, Fig. 3, with which cooperates a swinging tube 22 connecting with the conductor 20, and is further provided with a manually operated tack driver 24 on a driver bar 25. This bar is impelled downwardly by a spring 26 and stands normally down in the position shown in Fig. 3, and while in this position, a tack is fed through the conductor and comes to rest in the lower end of the swinging tube 22. The driver is lifted, when the operator desires to insert a tack, by force transmitted through the bell crank 30 to the stud 32 projecting from the side of the driver bar. The bell crank has the handle 34 located adjacent to the handle 15 to be conveniently operated in connection with the latter and it has the bevel ended spring plunger 35 which is automatically withdrawn from stud 32 when the driver has been lifted. As the driver bar is raised it allows the tube 22 to be swung by its spring 23 into position to deliver a tack to the pocket under the driver where it is inserted by the downcoming of the driver under influence of its spring 26. The driver bar returns the tube 22 to the position shown in Fig. 3. When the bell crank is reversely moved the plunger 35 snaps under the stud 32 for use again.

The attachment at one side of the machine will preferably have a provision as at 40 for retaining an eye or loop which has been previously formed in the end of a binding wire and through which the tack from the pocket 21 is driven to anchor the wire at one end. The tack pocket has a slot through which is movable a yieldingly upheld blade 39, see Fig. 3, which is depressed by the driver bar and extends slightly below the tack driving face of the bar. The blade 39 serves to force the wire down off the projection 40 and to a level to be tightened around the stem of the tack below its head.

While the foregoing is an example of mechanism with which my toe binding device may advantageously be used, said device is adapted for use separately from any such mechanism and for the purpose of binding toes as a more or less independent operation without regard to when or by what means the toes have been prepared for the binding operation. The toe binding wire is led through a guideway 41 in a wire placing arm 42 which has a pin 43 and a slot 44 connection with a plate 45 on the lower end of its support which is shown as the front tack arm of the machine and which may have an automatic movement from its inoperative position, as in said British patent, into an appropriate position adjacent to the shoe for the toe wiring operation to be effected. The wire passes from the guide under a tension lever 46 to a reel 48 which is carried by the wire placing arm. The wire placing arm has a rigidly attached handle 50 by which the arm is turned and slid under the plate 45 for drawing the wire around the toe of the shoe under the wiper plates 16 where it is held under tension in binding relation to the overwiped upper

while the machine is restarted to release the shoe, after which the wire will be twisted around the tack which has been driven at the second side of the shoe in the same manner that a hand operator is accustomed to twisting the wire around the anchor tack in binding by hand. The possibility which this apparatus affords for lasting one corner of the toe at a time and binding it in by the wire before the second corner is necessarily lasted and bound gives opportunity for the workman to last the toe in the pulling-over machine progressively and to exercise great skill and care in obtaining a smooth, well formed toe and binding it tightly. It is contemplated that the pulled over shoe turned out by the machine equipped with this invention will be in condition for presentation to the welt sewing-on machine without further treatment of its forepart.

Having fully explained the nature of this invention and described how it may be embodied in suitable mechanism, I claim as new and desire to secure by Letters Patent of the United States:—

1. A machine of the class described having, in combination, a support, a wire carrying device connected to said support and movable relatively thereto about the toe of a lasted shoe, and a separate tension device carried thereon through which the wire is drawn as it is bound about the shoe and having means under the operator's control for enabling him to apply through such device a substantially constant resistance to the pull of the wire in different positions of the carrying device.

2. A machine of the class described having, in combination, a wire placing arm, a support therefor movable to carry the arm into wire placing position, and upon which the arm is movable to place the wire around the toe portion of a shoe.

3. A machine of the class described having, in combination, a wire placing arm, a support to which the arm is connected to permit it to slide endwise and to turn to place the wire around the toe portion of a shoe.

4. A machine of the class described having, in combination, a wire placing arm, a support therefor movable to carry the arm into wire placing position, and upon which the arm is movable to place the wire around the toe portion of a shoe, and return means for restoring the arm to a position from which it has been moved.

5. A machine of the class described having, in combination, a wire placing arm, a support therefor on which the arm can move to present its wire guiding front end adjacent to the side of the shoe for the wire end to be anchored, and a spring against the action of which said movement is made and which reacts to hold the wire under tension between the anchoring point and the arm.

6. A machine of the class described having, in combination, a wire placing arm, a support therefor on which the arm can slide and turn to present its wire guiding front end adjacent to the side of the shoe for the wire end to be anchored, and a spring which allows free turning of the arm but resists said sliding movement outwardly and draws the arm backward to apply tension to the anchored portion of the wire.

7. A machine of the class described having, in combination, a wire placing arm, a support therefor on which the arm can move to present its wire guiding front end adjacent to the side of the shoe for the wire end to be anchored, a normally operative tension device acting on the wire carried by said arm and manual means for setting said tension device hard against the wire while drawing the arm backward to tighten the wire and a spring arranged to exert a constant backward pull on the arm to hold the wire taut.

8. A machine of the class described having, in combination, a support, a wire placing arm pivotally and slidingly mounted on said support, a reel carried on one side of the arm, a wire guideway extending obliquely through the arm from said side to the other one, and a tension device located between the reel and the guideway, substantially as and for the purpose described.

9. A machine of the class described having, in combination, a wire placing arm, a support on which said arm is pivotally and slidingly mounted, a handle by which movements of said arm can be effected, and a tension device having a finger operated lever arranged adjacent to said handle to be manipulated by that hand of the workman which grasps the handle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AMELIA A. BAYARD,
Executrix of the will of Emery Bayard.

Witnesses:
TERESSA H. BAYARD,
G. WILLARD RICH.

R. F. McFEELY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881.

Patented Mar. 2, 1915

3 SHEETS—SHEET 1.

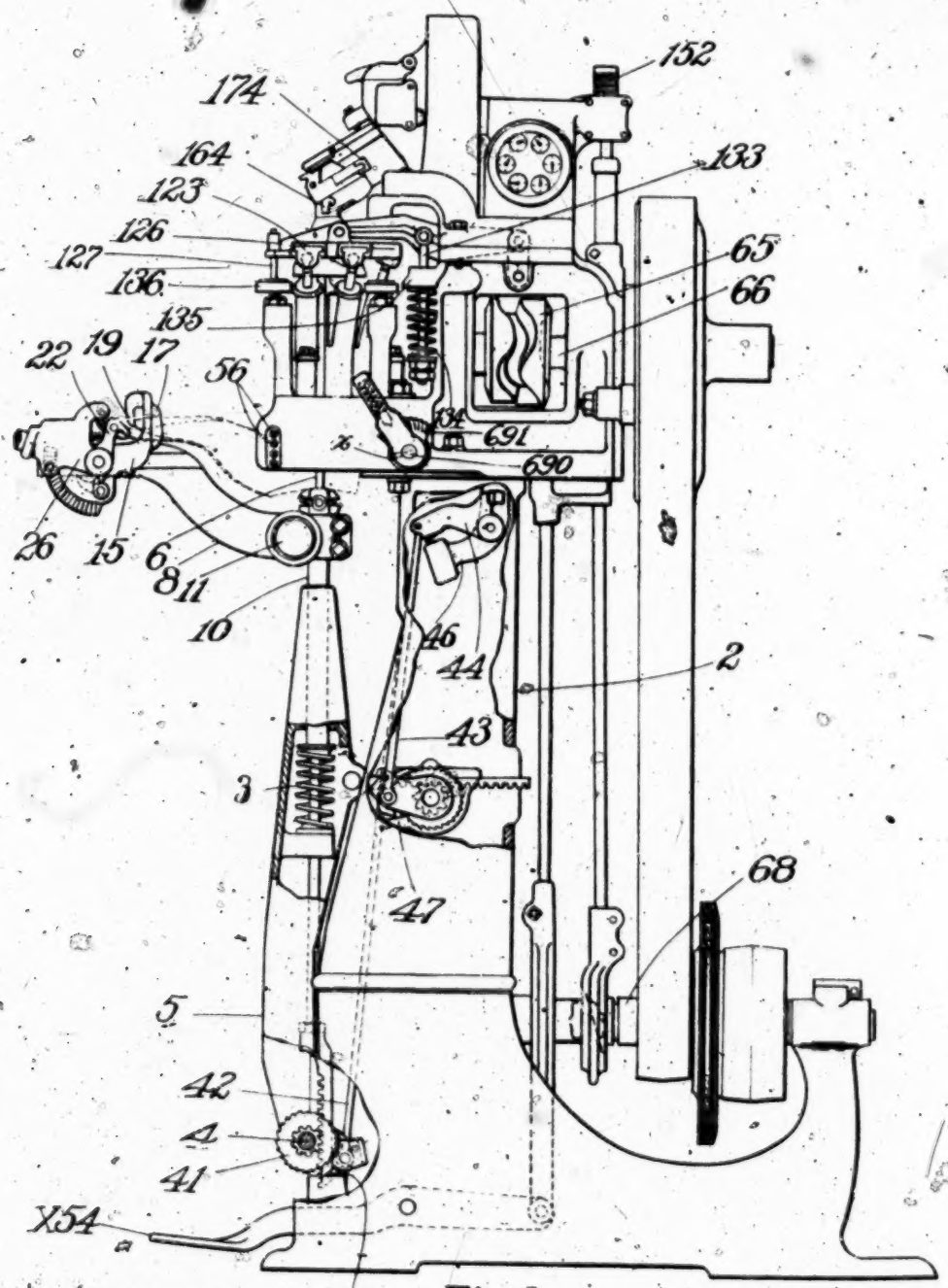


Fig. 1.

WITNESSES.

Elizabeth C. Coupe

Edith C. Hollcroft

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by [illegible] Attorney

Edward Maynard

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881.

Patented Mar. 2, 1915.

9 SHEETS—SHEET 2

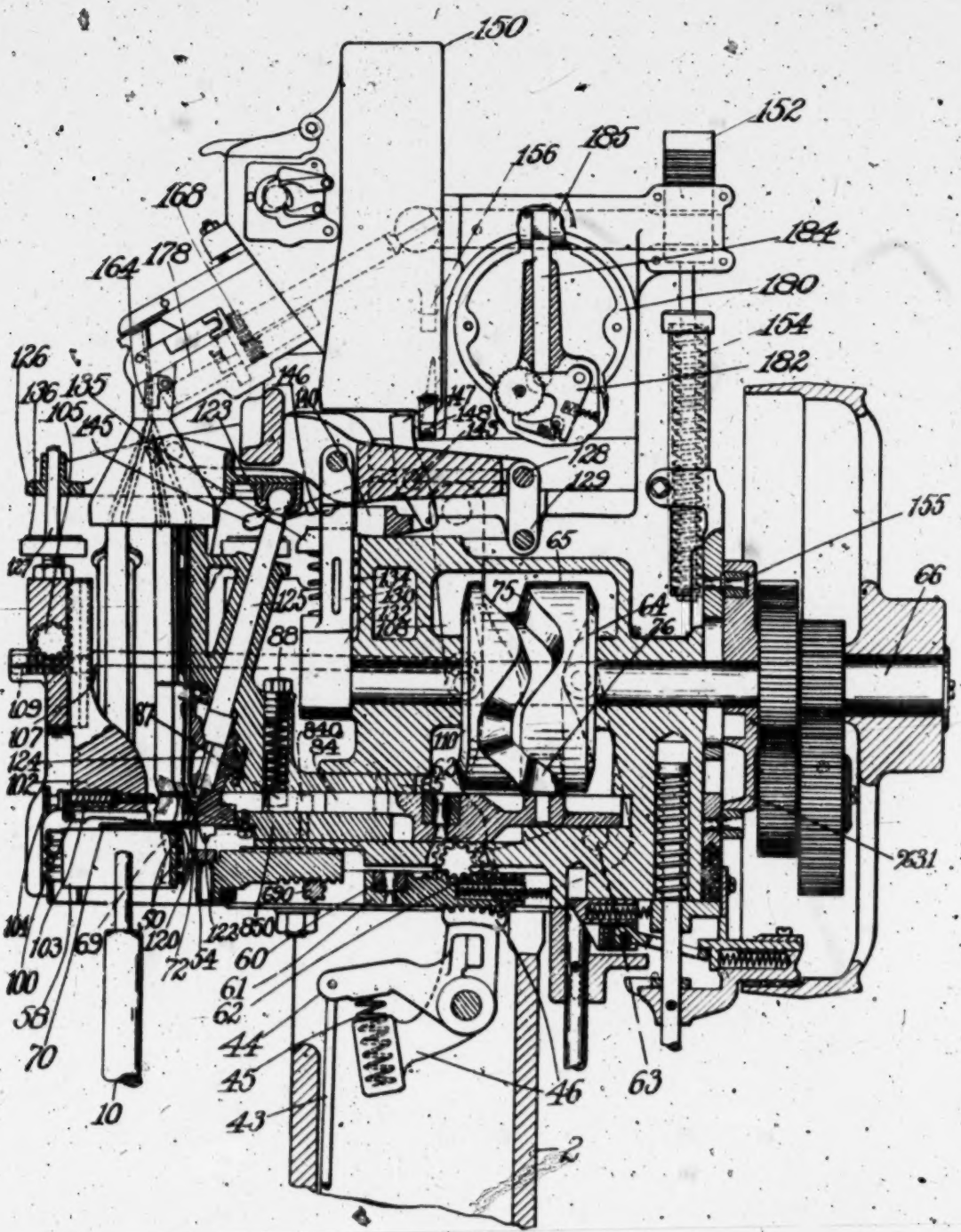


Fig. 2.

WITNESSES.

Elizabeth C. Coyle

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By his Attorney

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881. Patented Mar. 2, 1915.

9 SHEETS—SHEET 3.

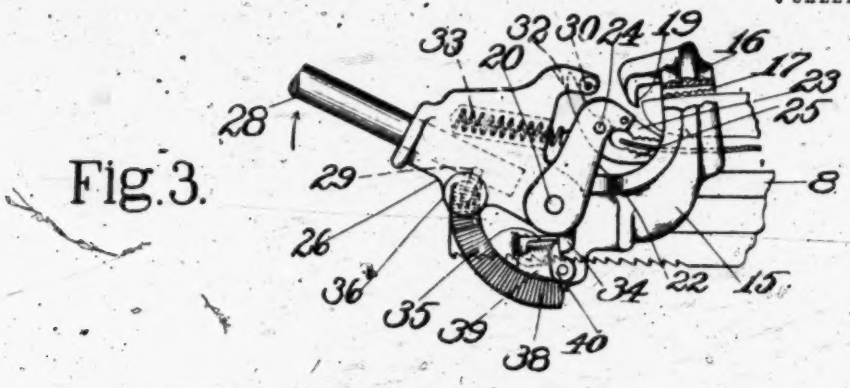


Fig. 3.

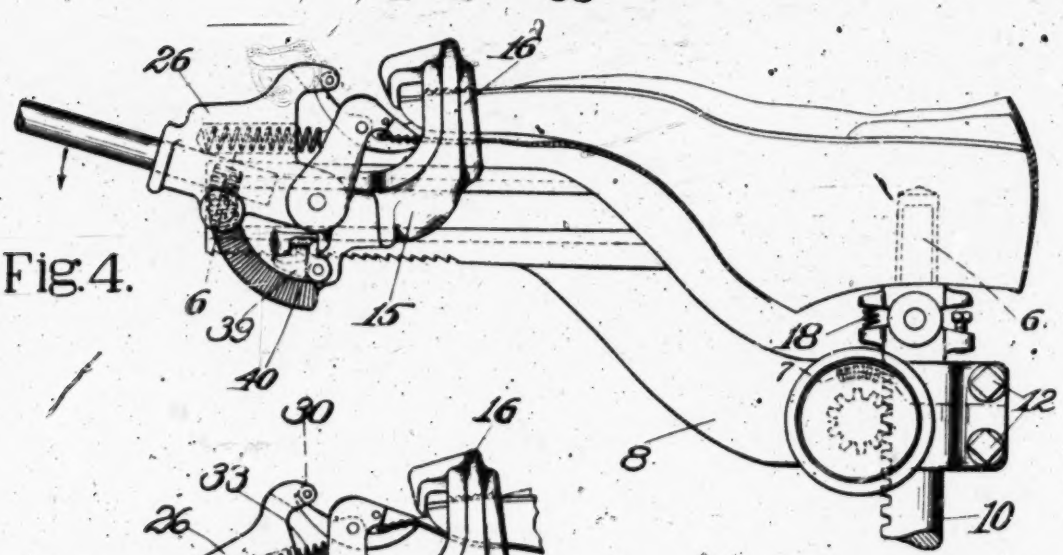


Fig. 4.

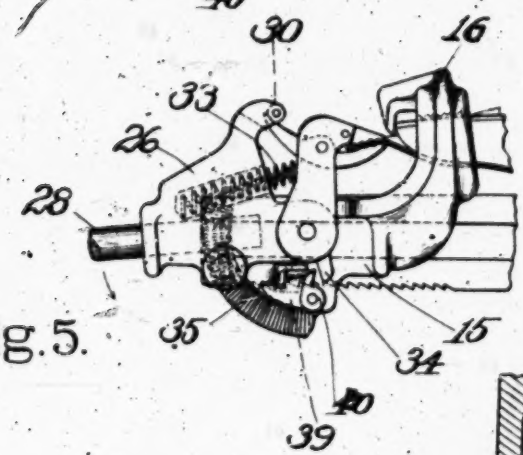


Fig. 5.

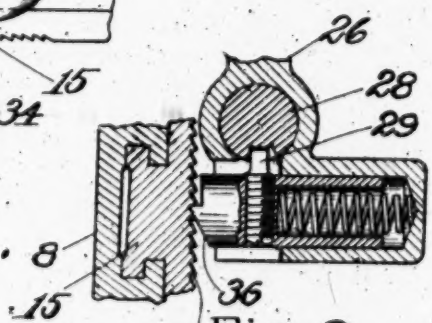


Fig. 6.

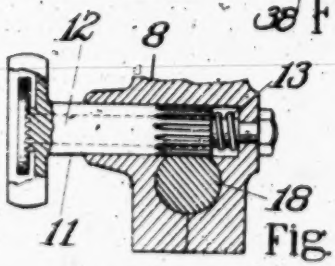


Fig. 7.

WITNESSES.

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881. Patented Mar. 2, 1915.

9 SHEETS—SHEET 4

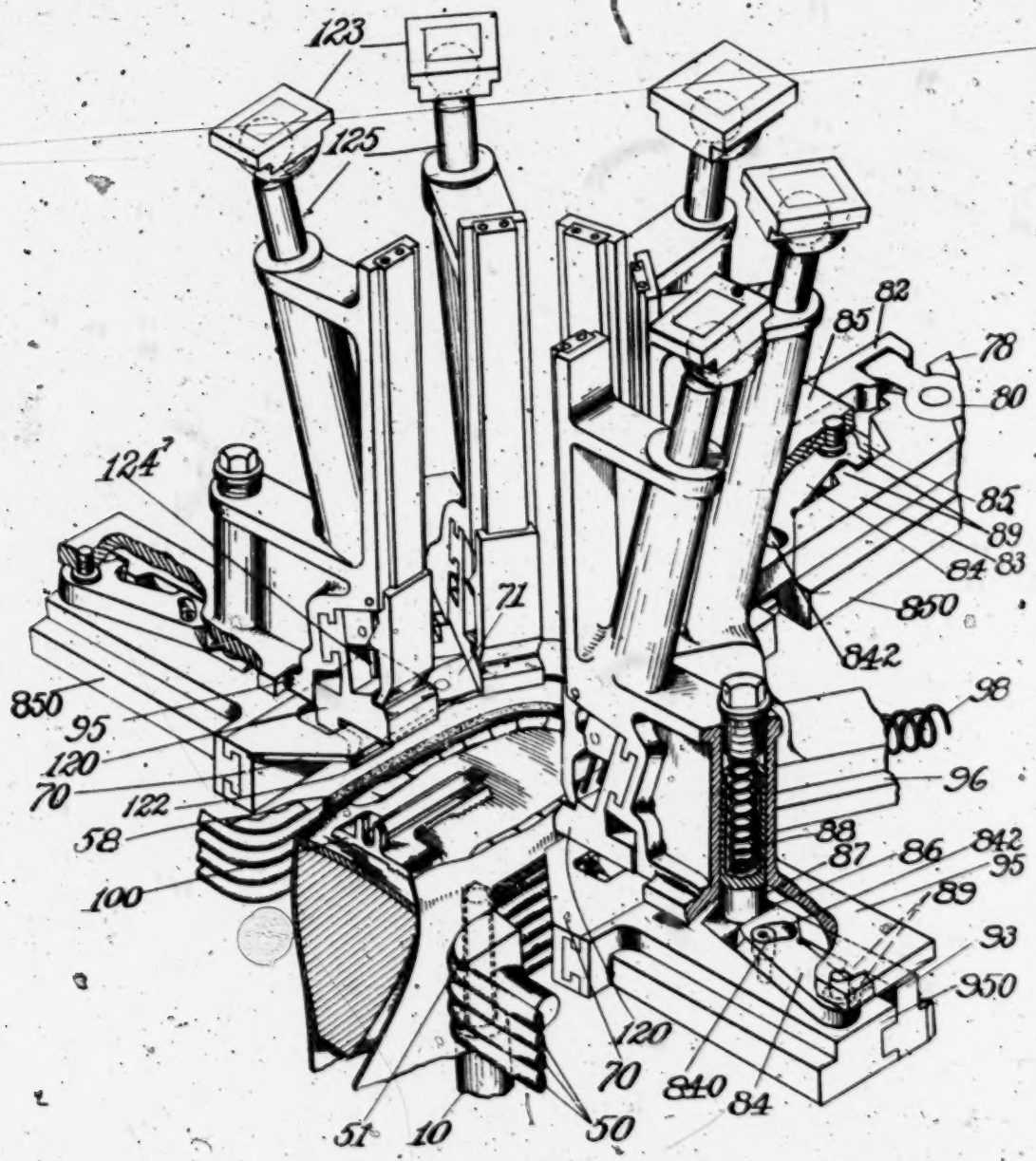


Fig. 8.

WITNESSES.

Elizabeth C Coyle

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881.

Patented Mar. 2, 1915.

9 SHEETS—SHEET 5

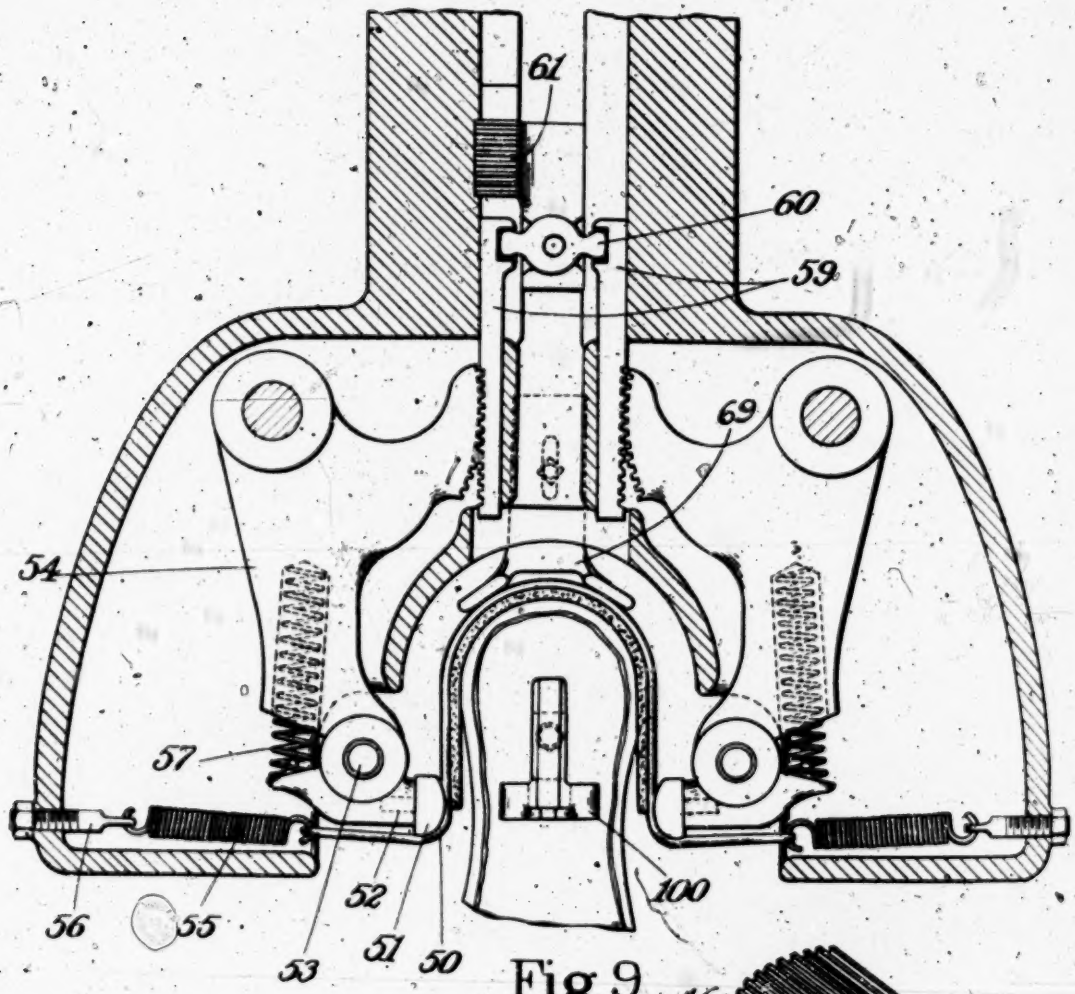


Fig. 9

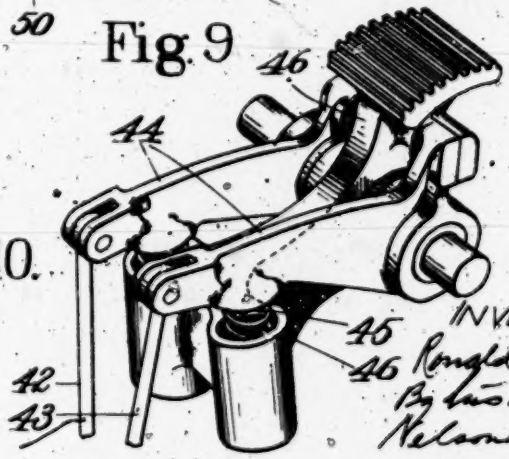


Fig. 10.

WITNESSES.
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276

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881.

Patented Mar. 2, 1915.

9 SHEETS—SHEET 6

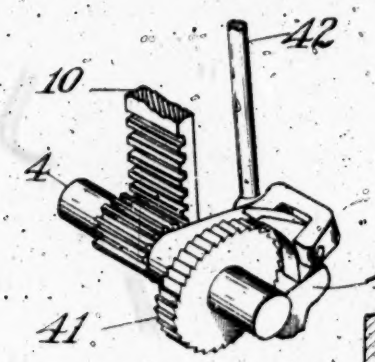


Fig. 11.

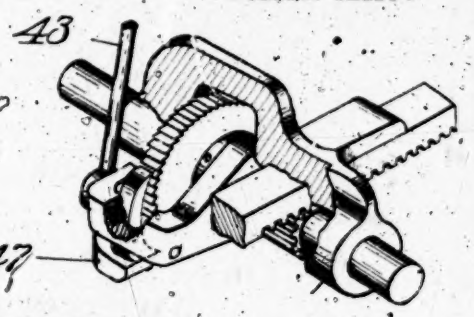


Fig. 12.

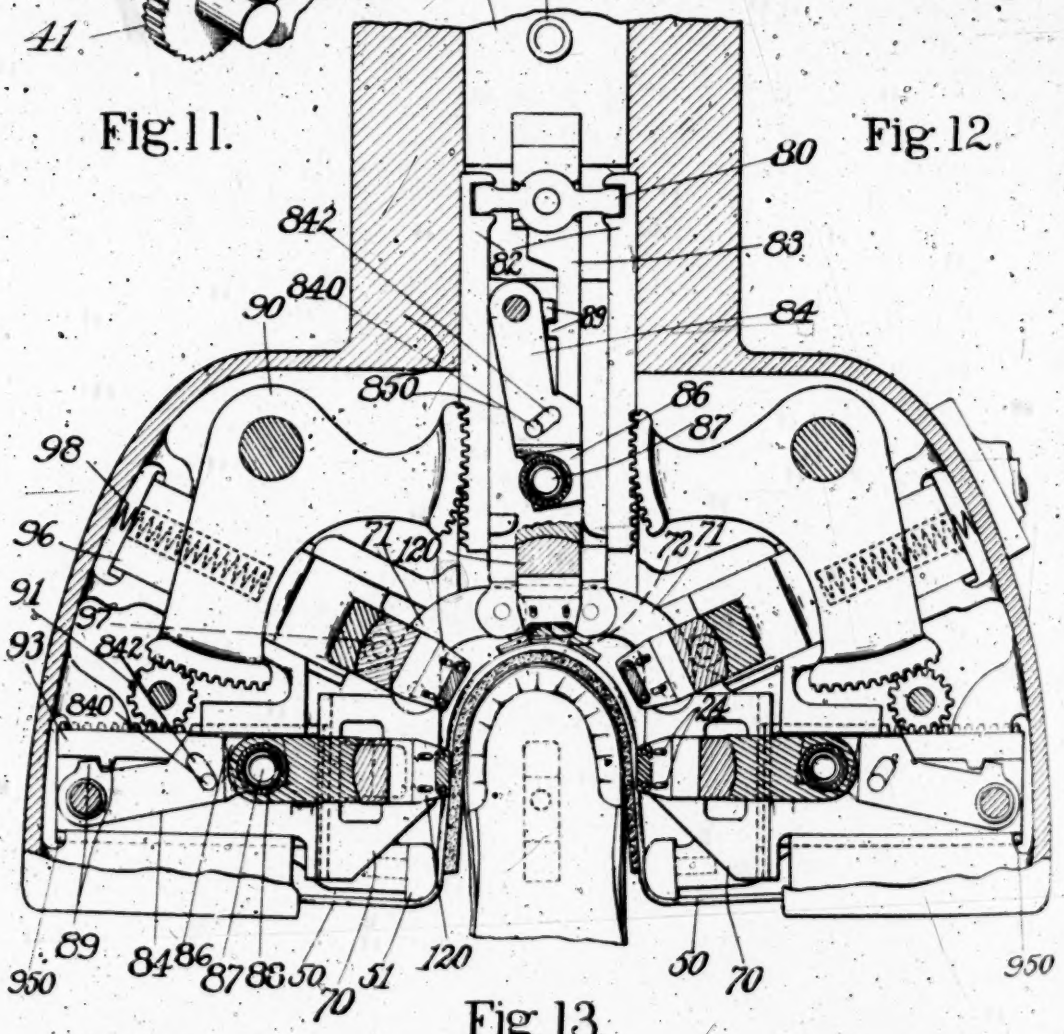


Fig. 13.

WITNESSES:

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881. Patented Mar. 2, 1915.

9 SHEETS—SHEET 7.

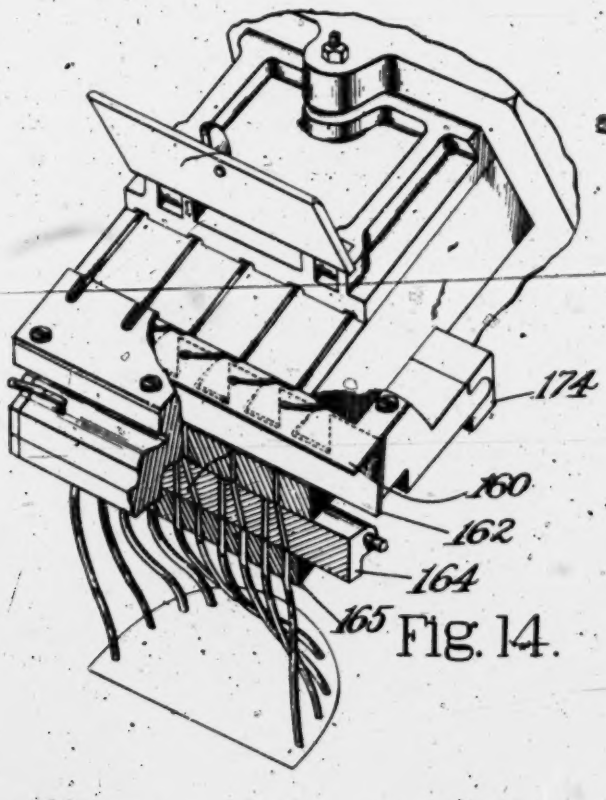


Fig. 14.

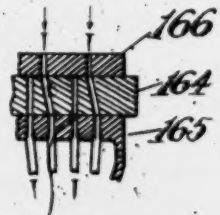


Fig. 16.

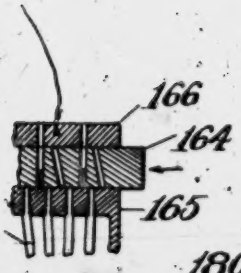


Fig. 15.

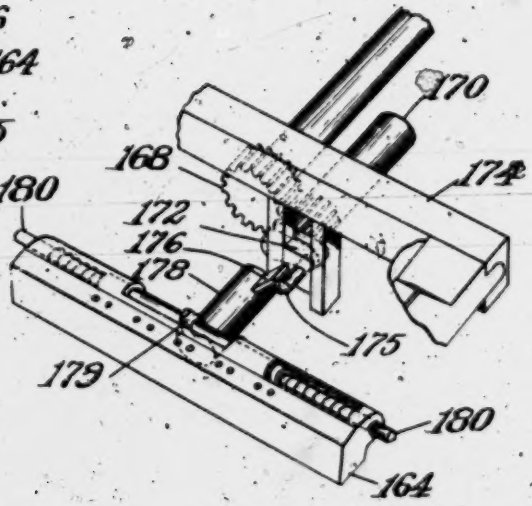


Fig. 17.

WITNESSES.

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By his Attorney

Nelson McDonald

R. F. McFEELY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881. Patented Mar. 2, 1915.

9 SHEETS-SHEET 8.

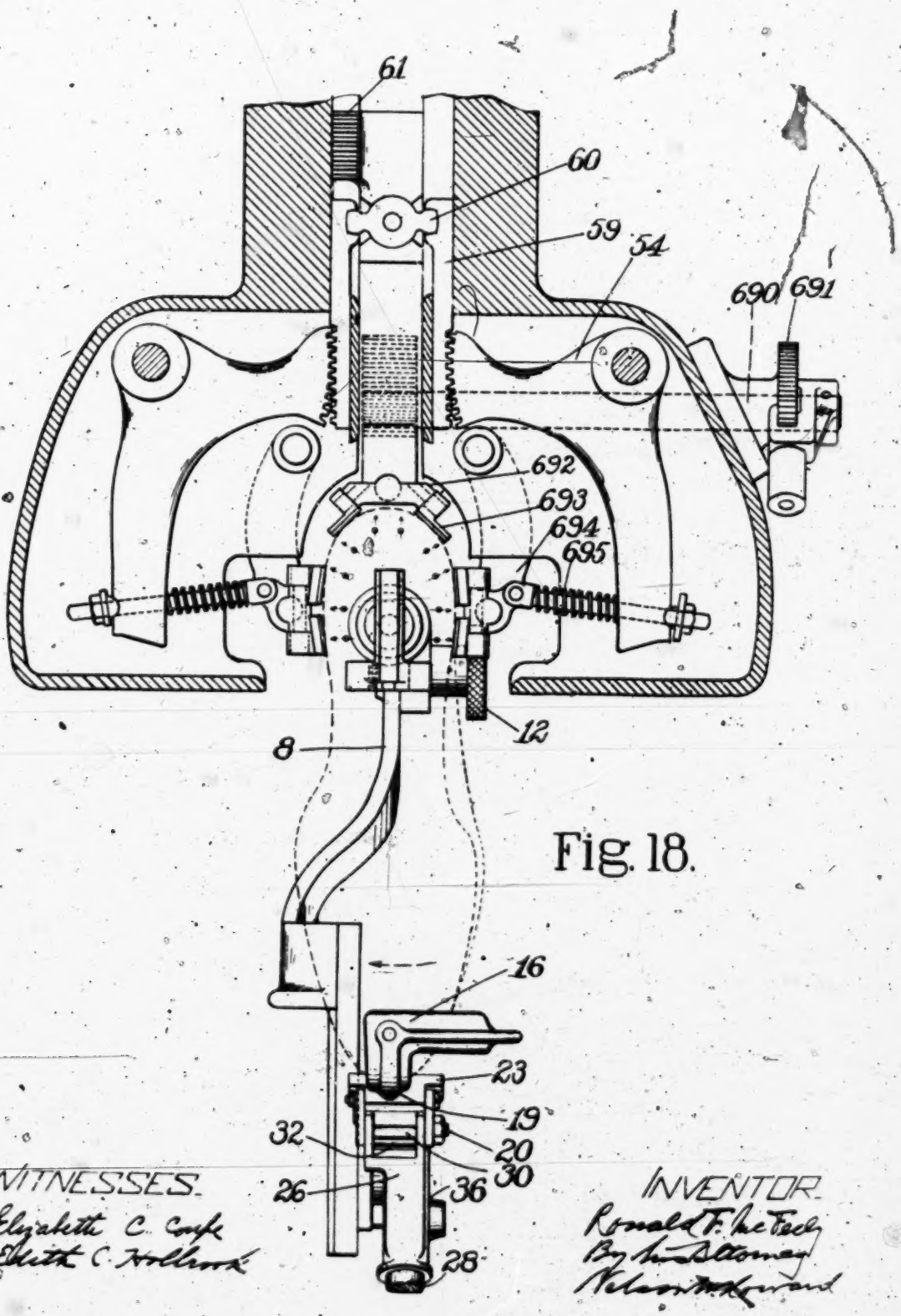


Fig. 18.

WITNESSES.
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Edith C. Holland

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By his Attorney
Nelson Hodgman

282

R. F. McFEELY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED AUG. 14, 1909.

1,129,881.

Patented Mar. 2, 1915.

9 SHEETS-SHEET 9

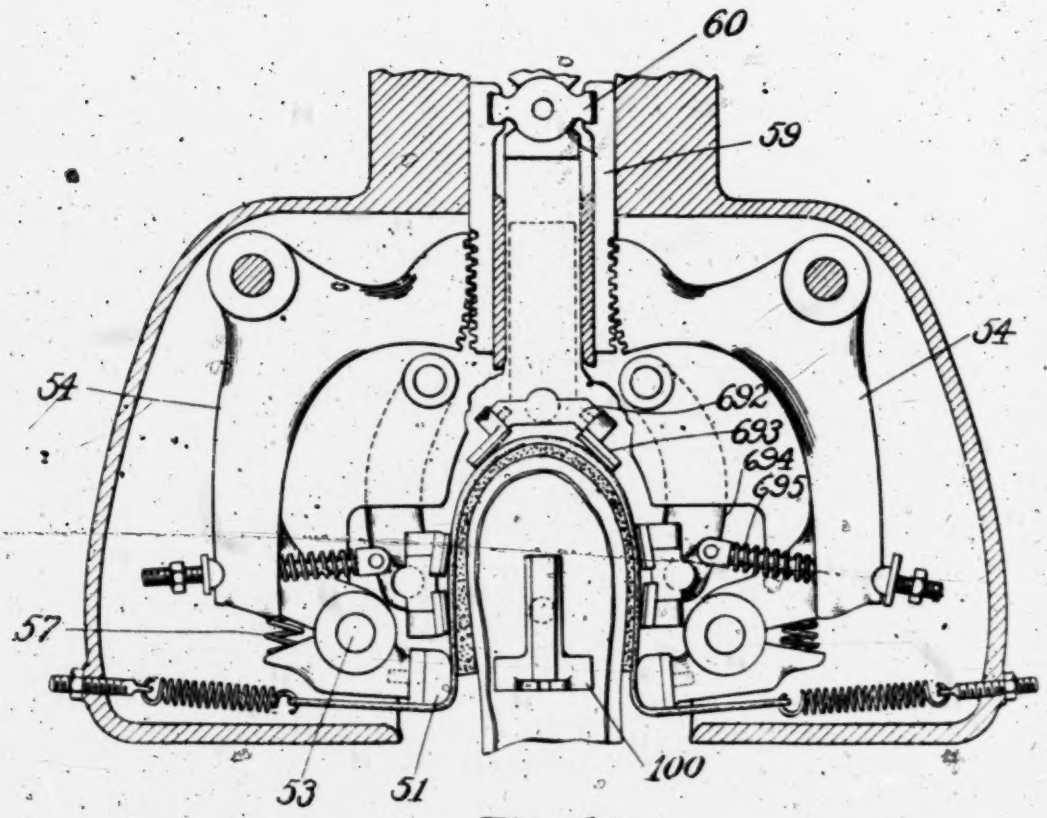


Fig. 19.

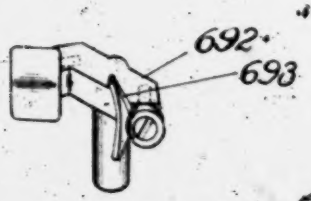


Fig. 20.

WITNESSES.

Elizabeth C. Coyle

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INVENTOR.

Ronald F. McFeely

By his Attorney

Nelson W. Howard

UNITED STATES PATENT OFFICE.

RONALD F. McFEELY, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

1,129,881. Specification of Letters Patent. Patented Mar. 2, 1915.

Application filed August 14, 1909. Serial No. 512,904.

To all whom it may concern:

Be it known that I, RONALD F. McFEELY, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Machines for Use in the Manufacture of Boots and Shoes, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to the manufacture of boots and shoes.

A broad object of the invention is to produce a machine which shall combine the operations of assembling a shoe and lasting the heel seat, operations heretofore performed by separate machines and as distinct steps in the manufacture of a shoe. The assembling operation as heretofore performed includes positioning the innersole and the upper materials, including the upper, lining and heel stiffener, in proper relation to the last and to one another, and securing them together in that relation. At a later and entirely distinct stage in the manufacture of the shoe, after the operation of the pulling over machine, the heel seat was lasted.

One important feature of this invention consists in improved means constructed and arranged for use in assembling a shoe.

Another important feature of the invention consists in improved lasting mechanism; and a further very important feature of this invention consists in a combination of shoe assembling means and lasting mechanism.

The machine herein shown and described, which is adapted like the assembling machine to operate upon parts of a shoe loosely arranged about a last, combines the operations of the assembling machine and a heel seat lasting machine. After positioning the parts of the shoe at the heel in proper position and while holding them in proper relation the machine effects the heel seat lasting operation. By the use of this machine the temporary securing of the parts of the upper in assembled relation is rendered unnecessary as the lasting is effected while the machine holds the parts in proper assembled relation so that an important saving of time and expense is effected and a greatly improved quality of work is obtained by performing on this machine operations heretofore separately performed by different machines as distinct steps in the manufacture of the shoe.

Another important feature of the preferred embodiment of the invention consists in the combination with assembling or other apparatus in the use of which the upper is put under forward tension about the heel part of the shoe, of lasting mechanism which operates to last the heel portion of the shoe while such tension is maintained. In the illustrated embodiment of the invention the assembling operation is made to include also the step of forwardly pulling the upper to conform it, particularly its marginal portion, to the shape of the side faces of the last.

Another very important feature of this invention consists in automatically operating heel seat lasting mechanism, with or without heel seat tacking mechanism which is also operated automatically.

Novel features of this invention will be found in the construction and arrangement of the shoe supporting and pulling means, with its adaptations to the steps of assembling and adjusting the loosely applied parts of the shoe into proper relation and then straining the upper lengthwise of the last and holding it under tension about the rear portion of the last; in the provision for movement of the shoe so prepared backwardly into the heel embracing band of the lasting mechanism and the actuation of that band further to conform the upper materials to the contour of the heel portion of the last while the upper is so held under strain; in crimping or overwiping mechanism constructed and arranged to adapt itself to the shape of the last; in automatic operating mechanism by which overwiping mechanism is caused to act repeatedly on the same portion of the shoe; in provision for automatically changing the relative altitudes of the wipers and the shoe during the lasting operation; in the gang tacking mechanism by which the heel seat portion of the shoe is fastened; and in other combinations found in the illustrated embodiment of the

invention, as will appear from the following description and the accompanying drawings.

These and other features of the invention including certain combinations of parts and more important details of construction will now be described in connection with the drawings and then pointed out in the claims at the end of the description.

In the drawings illustrating one embodiment of my invention, Figure 1 is a side elevation; Fig. 2 is a vertical section of the head of the machine on a larger scale and in the plane of the driving shaft; Figs. 3, 4 and 5 are side elevations on a larger scale than Fig. 1 of the upper stretching mechanism in different positions; Fig. 6 is a section on line 6 of Fig. 4; Fig. 7 is a section on line 7 of Fig. 4; Fig. 8 is a perspective view of the heel seat lasting mechanism; Fig. 9 is a horizontal section showing the means for carrying the counter conforming band; Figs. 10, 11 and 12 are details concerned with the shoe support positioning and locking mechanism which is shown also in Figs. 1 and 2; Fig. 13 is a horizontal section on a higher plane than Fig. 9 showing the overworking and tacking devices for the heel seat; Fig. 14 is a perspective view partly in section of the tack supplying mechanism also shown in Figs. 1 and 2. Figs. 15 and 16 are sections of the tack distributing mechanism in different positions. Fig. 17 is a perspective view of the operating device for the tack distributer. Fig. 18 is a horizontal section in the same plane as Fig. 9 showing the clamps used instead of the heel band. Fig. 19 shows the side clamps and heel band used together. Fig. 20 is a perspective view of one of the clamps.

The machine comprises a base 2 upon the top of which is mounted the head carrying the heel seat lasting mechanism and to the side of which near the front is pivoted at 4 the shoe support or jack carrying the shoe assembling and upper pulling apparatus. The jack post 5 can swing outwardly to clear the last thereon from the machine for giving access to all sides of the shoe in applying the last to the heel pin 6 and assembling and adjusting the upper materials and the innersole in proper relation. The arm 8 carrying the upper pulling devices is mounted on the spindle 10 upon which it can be freely adjusted vertically by the pinion shaft 11, see Figs. 4 and 7, which is a sleeve with a toothed head embracing a serrated disk on a rod 12. A spring 13 maintains locking contact between the head and disk as shown in Fig. 7. The spindle 10 with the shoe and the pulling devices can turn about the axis of the spindle to present either side of the shoe to the operator in the assembling and adjusting operations and to permit right and left crooked lasts to be positioned appropriately with relation to the lasting mechanism. The arm 8 trends upwardly from the spindle and in its forward portion has a horizontal guideway located directly below the last in which a block 15 is movable lengthwise of the shoe. This block comprises an overhanging arm 16 which rises from one side thereof as shown in the drawings to give opportunity for the shoe to be swung laterally thereunder into position for the upper to be gripped and pulled, and for the toe of the last to be swung laterally while the grippers hold the upper whereby the upper may, in effect, be adjusted longitudinally about the last and the tip line of the upper straightened or positioned at the desired angle across the last. The arm 16 has a rest 17 for engaging the bottom of the last or the innersole thereon, the toe end of the last being held up by a spring 18 acting upon the heel pin, and a rest 19 for engaging the end face of the last when the block has been adjusted to the right position in the arm 8 for the particular shoe in hand.

The block 15 supports pivotally at 20 the upper pulling device which comprises a gripper carrier 22 which is an angular member or lever on which one gripping jaw 23 is rigidly fastened while the other jaw 25 is pivoted thereon at 24. The pivot 20 also serves as the fulcrum for the gripper operating member 26 having the handle rod 28 and the guideway, formed by the roll 30 and the wall 32, for the tail of the jaw 25. A spring 33 in the operating member presses forwardly against the carrier 22 and rocks its heel 34 against a lug 35 located on the carrying block 15 below the pivot 20. This spring holds the jaws forwardly with relation to the operating member so that they will not retract relatively to the upper until they have closed and gripped it. The operating member carries a pawl 36, see Fig. 6, for engaging a curved ratchet face 38 formed on the block 15 to maintain the position of the operating member when it is not being moved. The pawl, which is a sliding bolt, has a pin 29 that extends into a notch in the handle rod 28 which is capable of being turned far enough to retract the pawl from the ratchet face when the operating member is to be moved upwardly as for relaxing the pulling strain on the upper. The arm 8 has ratchet teeth on its lower face which are adapted to be engaged by a pawl 39 on the block 15, see dotted lines in Figs. 3, 4 and 5, to lock the block and all the parts carried by it against forward movement on the arm and give stability to the fulcrum 20 while the upper is being pulled and held under tension. The pawl 39 is normally held away from its ratchet by the engagement of heel 34 with the arm 40 of the pawl and is permitted to be turned up, by its spring, against the ratchet on arm 8 only after the gripper

carrier with its heel 34 has been turned forwardly in pulling the upper as shown in Fig. 5. The arrangement of the spring 33 provides for holding the gripper carrier in a normal position determined by the engagement of its heel 34 with the lug 35 and with the jaws either open or closed depending upon the position in which the operating member 26 is held by its pawl 36. When the operator has applied the last to the heel pin with the upper materials and innersole loosely or otherwise placed thereon and positioned the slide 15 according to the length of the last with the rests 17 and 19 in the relation shown in Fig. 3 he will lift the handle rod 28 to open the jaws if they are closed. This movement forces shoulder 32 against the tail of jaw 25 to turn that jaw on its pivot 24 as will be clear from Fig. 5. The upper having been straightened out and properly positioned within the jaws the handle 28 will be depressed. The spring 33 holds the gripper carrier and its jaws from rearward rocking until they shall have gripped the stock and the roll 30 then engages the tail of jaw 25 for forcibly pressing it in the closing direction. In the continued downward movement of the handle rod the roll is pressed against the tail piece and acts therethrough to draw the grippers backwardly about fulcrum 20 to stretch the upper as will be understood by comparing Figs. 4 and 5. It is to be noted that the pulling movement of the grippers takes place about the pivot 20, the points of the jaws being raised as they pull so that the upper is bent about the end of jaw 25 to increase the holding power of the jaws with the increase in tension applied. Preferably the upper is not bent upwardly over the toe end of the last in a way to interfere with tightening the marginal edge of the upper throughout the length of the vamp and the grippers therefore hold the upper materials including the heel stiffener conformed to the contour of the heel of the last for the heel seat lasting operation.

The rests 17 and 19 constitute convenient means for positioning or adjusting the innersole lengthwise on the last bottom if the innersole is unattached to the last as it is in the manufacture of many shoes. When the innersole is to be positioned with relation to the heel end face of the last the block 15 may be initially positioned to have a slight backward movement before the stop 19 meets the end of the last and in this movement the innersole will be caused by the roughened rest 17 to slide heelward until it meets the heel stiffener or upper material. Then when the upper is pulled toeward the heel end of the innersole will be pushed forwardly until it is flush with the rear face of the last. These movements are slight and not enough to cause any objectionable bowing of the innersole but rather tend to cause the innersole to lay down snugly into the shank of the last as it should do to facilitate the heel seat lasting operation. If the innersole is to be positioned with relation to the toe end of the last the stop 19 may first be positioned against the toe of the last as in Fig. 4 and the innersole then abutted against the stop, the toe of the last being tipped downwardly enough to relieve contact of the rest 17 with the innersole during the adjustment of the latter.

The jack includes a spring 3 which as shown in Fig. 1 is strong enough to uphold the spindle 10 with the shoe thereon and when the upper has been satisfactorily pulled toeward and fitted to the last the jack post is swung inwardly, within the heel band and against a suitable back stop 69 the shoe being depressed to permit it to go under the heel bottom rest which will be described. The lower end of the spindle is formed as a rack which engages a pinion on the shaft 4 upon which the jack post is pivoted. This shaft also has a rigidly attached ratchet wheel 41 as shown in Figs. 1 and 11 which is engaged by a pawl on the lower end of a rod 42 to turn the shaft and its pinion in the direction for uplifting the spindle from the power shaft during the operation of the machine for a purpose which will be described. A similarly constructed but horizontally arranged rack bar, pinion, ratchet wheel and pawl connection shown in Fig. 12 is provided between the jack post and a rod 43 for inswinging the jack and the shoe from the power shaft, and these rods, which with their associated parts are shown in Figs. 12 and 13 on a larger scale than in Fig. 1, are connected to bell-cranks 44 mounted on a fixed pivot rod as shown in Fig. 10. The outer ends of the cranks 44 rest upon springs 45 in the outer arm of a bell-crank 46 the upper arm of which is a segment which, through suitable connections later described, receives motion from the power shaft. This movement upwardly for the rods is transmitted yieldingly by the separate spring 45 and turns the ratchets in the direction to uplift the spindle and shoe and to pull them backwardly into the machine. Reverse movement is transmitted to the rods unyieldingly through contacting faces of the upper arms of the bell cranks as may be seen from Fig. 10 and forces the tails of the pawls into contact with the stops 47 which swing the noses of the pawls away from their ratchets leaving the latter free to turn. This is the condition which exists between the end of one cycle of the machine's operation and the beginning of another cycle and prevails while the workman is removing one shoe and applying and pulling another shoe.

The illustrated heel lasting mechanism

into which the shoe is thrust backwardly after the upper has been pulled and adjusted includes a plurality of separately movable parallel cords, bands, or the like 50 arranged to extend about the heel portion of the shoe from the shank on one side to the shank on the other. The end portions of the cords are bent outwardly over the swiveled heads 51 of blocks 52, pivoted upon the front arms of angle levers 54, and are attached to separate springs 55 which are independently adjustable by threaded anchors 56. A lining 58 of leather, rubber, felt or other suitable material is arranged within the bands 50 and distributes the pressure of the bands without interfering with their relative conforming movement to adapt them to the contour of each last when they are put under tension by the actuation of the levers 54. This is effected through the connecting rods 59 and equalizer 60, see Fig. 9, the latter being mounted on a toothed slide 61 which is engaged by a pinion, see Fig. 2, which is turned by a toothed angle lever 62, see Fig. 2, fulcrumed at 63 and having a roll in engagement with the rear cam face 64 of the cam block 65. This cam block is carried by the cam shaft 66 which is driven through a clutch and connections to the lower pulley shaft 68 which driving parts are or may be substantially like those shown and claimed in United States Letters Patent, 791,686, of June 6, 1905. This clutch mechanism need not be here further described than to state that it is actuated by a treadle X^{34} to cause the machine to be started and that the cam disk X^{31} has suitably formed and located rises to cause the machine automatically to come to rest at predetermined times which will be later noted. The backward movement of the slide 61 effected by the rise in the cam face 64 turns the angle levers 54, swings their front ends inwardly and, through the blocks 52, forces the bands and their lining toward the sides of the last. This inward movement of the levers 54 extends the bands 50, anchored to the screw bolts 56, putting the springs 55 under tension and causing those springs to exert an endwise pull on the bands for drawing forwardly upon the counter and upper as they are conformed to the sides of the last. The block 52 is pivoted to the lever 54 at 53 and a spring 57 maintains the block in a normal position. The location of the pivot 53 back of the head of the block causes that block to be projected forwardly as lever 54 closes toward the shoe. The slide 61, actuated from the cam face 64, is toothed on its lower face as shown in Fig. 2 to engage the upper arm of the angle lever 46 before described by which the shoe is lifted and pulled back into the machine and is locked there to receive the heel seat lasting operation. Any other mechanism suitable for clamping the heel portion of the upper materials to the last may be used instead of that above described. A back stop 69 is adjustably mounted in position to limit the backward movement of the shoe into the elastic heel band which is effected by the connection to the jack post through the rod 43. This insures a predetermined positioning of the shoe lengthwise with relation to the operating parts of the machine. The back stop is forked to center the shoe laterally independently of the band and thus assist in positioning the shoe laterally with relation to the lasting and tacking mechanism. In Fig. 18 the back stop is shown as formed on a rack bar adjustable by a shaft 690 having a handle at the side of the machine with a pawl in it to engage a locking ratchet 691 having marked on it graduations indicating the proper adjustment for different sizes. The ratchet can be adjusted to position the graduations for different groups of sizes such as men's, women's or children's sizes. In this figure and also in Fig. 19, the back stop is shown as provided with a swiveled head 692 on which in turn are swiveled two contact blocks 693. A detail of this device is shown in Fig. 20. In Figs. 18 and 19 there are also provided side clamps on arms 694 actuated by springs 695 on rods guided in the swinging arms 54, above described, to clamp the upper against the sides of the heel as shown. The contact members of these side clamps are like those located at the end of the heel and the front member at each side is located to press the end portion of the counter against the side of the last. These side clamps may be used in place of the heel embracing band 50, as illustrated in Fig. 18, or in addition to the band, as shown in Fig. 19, or they may be omitted altogether, as in Fig. 9, according to the nature of the shoes being assembled and heel seat lasted. If the shoes are of stiff material, the clamps will be useful in securing a good conformation of the heel stiffener to the contour of the last and if fine shoes are being lasted which have stiff counters the band will be employed to distribute the pressure of the clamps and avoid any danger of marring the stock. For light shoes the band alone will probably be sufficient.

The devices for breaking down the counter and upper over the edge and upon the bottom of the heel seat are shown best in Fig. 13 in connection with Fig. 2 and comprise the wiper plates 70, 70, 72 and the links 71, 71 arranged to embrace the entire heel end portion of the shoe and to wipe inwardly and forwardly over the heel as they are closed from the position shown in Fig. 13. These devices receive their movements from the cam block 65, before mentioned and shown in Fig. 2, which has a cam path 75 in which stands a roll 76 on a slide 78 that is connected by an equalizer 80 with

rs 82, see Fig. 13, and also carries the id forwardly projecting arm 83. This m 83 has a yielding connection with the per plate 72 provided by the following rangement: The arm 83 has a beveled end ce which abuts against a similar face on displaceable member 84 that is pivoted to slide 85 and by which the wiper 72 is ac- ated through the stud 840 and sub-slide 50. The member 84 has a beveled upper ce at 86 upon which rests a beveled plun- er 87 carried in the slide 85 and pressed pon by a heavy spring 88, see Figs. 2 and 3. The spring plunger maintains the embers 83, 84 normally in the relation hown in Fig. 13, but permits the member 4 to turn and the movement of the wiper 2 to cease when resistance to such move- ment overbalances the tension of the spring 8. Normally however the wiper will over- come any resistance offered by the work nd complete its stroke into predetermined position over the last bottom to wipe the upper into position to be tacked. The tack- ing is effected by mechanisms to be more fully described and each of which includes a tack block 120 carried by the slide 85 and having a depending lip or stop 122 to meet the side of the last, or the heel band that embraces the last, and position the tack blocks for tacks to be inserted at a definite distance from the edge of the shoe bottom. When this stop 122 arrests the movement of the slide 85 the beveled faces of members 83, 84 wedge sidewise against the influence of spring 88. The member 84 has a cam slot 842 into which the stud 840 of the sub- slide or wiper slide 850 projects and when member 84 is wedged sidewise as described the cam slot 842 acts on the stud 840 to re- tract the wiper slide and wiper slightly with relation to the shoe and with relation to the tack block so as to permit the tacks to be driven into a portion of the upper which has been wiped in and pressed down by the wipers to smooth and prepare it for the re- ception of the tacks. The machine thus automatically follows in this respect the well known and advantageous procedure of the operator of manually actuated bed last- ing machines who "backs up" his wipers preparatory to tacking the heel seat. The members 83, 84 have coöperating lugs 89 by which member 84 is returned to its ini- tial position when member 83 is retracted.

The bars 82 connected with the equalizer 80, see Fig. 13, have toothed engagement with angle levers 90 which in turn have toothed connection through pinions 91 with rack bars 93. Each rack bar 93 is connected with a slide 95 corresponding to the slide 85 of the heel wiper actuating mechanism which actuates the side wiper plates 70 by the same arrangement, including parts 84, 840, 842, 86, 87, 88, 89 and 950, that connects the bar 83 to the wiper plate 72. These parts are illustrated in Fig. 8 as well as in Fig. 13. The wiper plates 70 have an end- wise sliding connection with the slides 950. The links 71 are pressed against by rolls 97 on plungers 96 which are guided for move- ment in a direction substantially perpen- dicular to the corners of the heel of the last being operated upon, or the curved portions connecting the back end of the heel and the sides of the heel. The plungers 96 are pressed forwardly by stiff springs 98 to hold the links up to their work of breaking down the upper and counter as the wipers and links are advanced and closed in over the heel seat.

The construction and arrangement of the parts just described provides that move- ment will be transmitted from the cam path 75 to the wiper plate 72 and through that plate and the links 71 to the wiper plates 70 to advance the wipers. This carries the wiper 72 over the heel seat of the shoe and moves the wipers 70 endwise in blocks 950 and the links forwardly with relation to the plungers 96. Simultaneously with this forward movement motion is transmitted through the angle levers 90 and the de- scribed, independently yielding, connections to close the side wipers and the corner wipers or links 71 inwardly over the heel seat, thus gathering the upper inwardly in substantially radial lines over the heel seat. The provision for effecting the forward movement and the inward movement from each side of the shoe through independently yielding connections permits the wiping or breaking down means to adapt or conform itself to the contour of each shoe and this is facilitated by the flexible connection 71 be- tween the plates 70, 72, which act at the ends and back of the heel seat. The independ- ently yielding connections also facilitate the adaptation of the wipers to the shape and position of right and left shoes which differ greatly when made on crooked lasts. This however is largely provided for by arranging the jack so that the shoe can swing laterally about the axis of the spin- dle 10 to center both right and left shoes in the lasting devices.

The cam path 75 is formed, see dotted lines representing the back of the cam block in Fig. 2, to give a slow inward actuation of the breaking down means and then, see the full lines on the front side of the cam block, to retract these means and advance them a second time in the same cycle of the machine's operation. It is intended that the first or essentially breaking down ad- vance shall take place with the shoe in a lower position than the second or wiping in and ironing down movement. Accord- ingly, means for controlling the vertical position of the shoe is provided and is con-

nected with means for changing that vertical position automatically between the two actuations of the upper overworking means. The shoe bottom rest 100 is formed as shown in Fig. 8 to contact with the shoe bottom at a plurality of points including points at opposite sides of the innersole near the heel breast line to position the shoe as to transverse inclination of the heel bottom and to clamp the insole down firmly upon the last bottom near its opposite edges. This bottom rest is movable endwise in a guideway formed in the lower face of a block 102 and is pressed forwardly therein by a spring 103 against an adjusting screw 104. The block 102 is guided for vertical movement in the machine head and has rack teeth engaged by a pinion 105 coupled by a rack rod 107 to a lever 108 which is fulcrumed at its upper end and is held by a spring, 109, acting on the rack rod, against a cam face 110 formed on the front end of the cam block 65. This cam face is formed with relation to the cam track 75 for the bottom rest to be raised between the first and the second advance of the wipers so that the shoe may come up to the level of the wipers before their second advance, whereby the upper is caused to be firmly wiped or ironed down upon the last bottom to form a firm, smoothly lasted heel seat. The lifting of the shoe is effected by the strong spring 45 located in the jack lifting mechanism which is put under tension when the jack is locked up. The cam face 110 is also formed to depress the bottom rest again after the tacks are driven, as will be described, and before the wipers are finally retracted. This is to depress the shoe from the wipers and to relieve the pressure of the wipers and prevent them from dragging over the lasted and tacked upper in their final retraction. It will be remembered that the wipers are partially retracted before the tacks are driven so that the tacks may be inserted through a portion of the upper that has been smoothed and compacted by the wipers as is customary in the use of hand operated lasting machines.

The slides 85, 95 and 96 support the tack blocks 120 of which there are five mounted in said slides as shown in Figs. 8 and 13 to have a small amount of angular movement in a horizontal plane. These blocks have projections extending downwardly through slots in the wipers and carrying feelers or gages 122 arranged to engage the side of the shoe, or the counter, clamping bands and thereby limit the inward movement of the tackers and also determine the position with relation to the edge of the shoe at which the tacks shall be inserted. The gages also effect the necessary turning of the tack blocks in their slides to position at substantially the same distance from the edge each of the two tacks which the blocks are arranged to carry. The tack pockets in the blocks 120 are inclined so as to drive the tacks toward the center of the heel and the drivers 124 are similarly inclined. This arrangement provides that the ingoing tacks which are simultaneously driven all the way around the heel seat shall by reason of their inclination draw the upper inwardly from the edge of the last. These tacks are driven in front of the wipers into a portion of the upper materials which therefore is not held down in lasted position and the indrawing effected by the inclined tacks is therefore particularly advantageous because it takes up or reduces the slack that otherwise would be liable to exist between the line of tacks and the edge of the wipers. A single driver rod 125 carries two drivers 124 and the turning movement of the tack block takes place about the axis of that rod which is connected by a slide block 123 and a ball joint to the driver plate 126 guided to move in rigid lines by the post 127. The driver plate is the broadened front end of a lever fulcrumed at 128 upon a link 129 and having a depending hinged link 130 the foot of which rests upon a cam 132 on the front end of the cam shaft 66. This cam serves to lift the driver lever and the drivers against the tension of springs 134 suspended by rods 133 from the lever to be compressed against a shelf 135 on the frame preparatory to actuating the driver lever downwardly to insert the tacks when the cam permits said springs to close. Adjustable stops 136 on the frame limit the down stroke of the drivers and determine the extent to which the tacks shall be driven.

A forked slide block 140, see Fig. 2, resting on the machine frame is adapted to be advanced by a T lever, pivoted at 143 and having a handle arm 145, into a position under shoulders 146 on the lever-raising link 130 and prevent the descent of the lever for driving the tacks until the operator has had opportunity to examine the shoe after the second inwiping of the lasting devices. The slide block may then be retracted to permit the driving of the tacks, or if the shoe is not properly lasted and must be submitted to a second cycle of the machine's operation the block may be left until a suitable time in the next cycle when it will be automatically retracted by the engagement of a wedge 148 which is shown as carried by the rotating tack hopper 150 with the upper arm 147 of the lever. The tacks are fed by mechanism later to be described from the hopper 150 which is oscillated by a rack bar 152 through a spring 154 from a cam track 155 in the side of the cam X^{31} on the cam shaft 66. These parts do not in themselves form a part of this invention and may be of previously known construction.

The hopper has a stud 156 between which and the wedge 148 the arm 147 is set when the slide block 140 is advanced to obstruct the descent of the drivers. This stud prevents the oscillation of the hopper through a great enough angle to effect the separation and feeding of a second set of tacks until the set which is waiting to be driven has been inserted and if the cycle of the machine is completed without driving the waiting set then the feeding mechanism is rendered ineffective for that cycle but the wedge 148 forces the tack stopping devices to normal position in time to permit delivery of tacks for the next cycle. The block 140 and the arm 147 constitute connected means for controlling the feeding and the driving of the tacks. By the use of these devices the machine can be made to repeat its cycle as many times as may be required with the tacking mechanism each time ineffective and thus a particularly stubborn shoe be lasted in by successive operations of the wipers and finally tacked when it is in satisfactory condition.

The tacks which gravitate down the raceway grooves, Fig. 14, from the hopper are separated by a slide 160 with which moves a notched gate 162 and are delivered through the oblique slots and eyes in said plate as described in United States Letters Patent No. 1,002,421, granted on my application Sept. 5, 1911. There are five raceways and the separating mechanism is arranged to be reciprocated twice in each cycle of the machine to deliver ten tacks, which is the number the machine is designed to drive at one time. To this end a receiving plate 164 is provided which is guided for endwise movement between the conductor or tack tube anchor plate 165 and a cap plate 166. The receiving plate has ten pockets arranged in two series alternating and so positioned that when the first series is in receiving position the points of the tacks will rest upon the anchor plate and will not be discharged into the tack tubes until the receiving plate has been moved to put the second series of pockets in receiving position in time to take the tacks from the second actuation of the separating devices. At this time the first set of tacks will be discharged into the tubes and the second set will fall directly through the receiving plate into the tubes as shown in Fig. 16 so that the two sets of tacks fall into the tubes which lead them to their pockets under the devices, Fig. 2, at nearly the same time. This concentrates the tack delivering period and leaves the remainder of the time occupied by the cycle of the machine for other operations. One series of tack pockets is arranged oblique to the other so that the extent of movement of the receiving plate to position all its pockets in alinement with the tubes in the conductor plate and discharge the tacks may be different from the spacing between the tubes in the conductor plate. A different number of tacks may be fed in any multiple of the number of the raceway grooves. For actuating the separating devices to take from the raceways two charges of tacks in each cycle the pinion 168 which formerly directly reciprocated the separating devices meshes with a pinion 170 of half the number of teeth which has a crank connected to the block 172 in the depending fork of the separator driving bar 174 and from which that bar and the separating devices receive a complete reciprocation from the oscillatory movement of the pinion 168 and the hopper in one direction and a second complete reciprocation from the oscillatory movement in the other direction. The crank block has a stud 175 arranged to contact at times with an arm 176 on a shaft 178 that has a tooth 179 having a yielding connection with the delivery plate by means of spring plungers 180 as shown in Fig. 17. This arrangement is such that as the stud 175 turns downwardly and to the left in Fig. 17 it leaves the arm 176 and the delivery slide 164 at rest in what may be considered to be the discharging portion of the slide until the stud nearly completes its rotary stroke when it will reach a position to contact with the upper side of the arm 176 and move the delivery slide into its first receiving position shown in Fig. 15, in time to take the first set of tacks discharged from the oblique slots and eyes of the separating plate 160. On the reverse oscillation of the pinion 168 and the hopper the stud will leave the arm 176 again and not contact with it until it approaches the Fig. 17 position whereupon it will turn the arm and move the delivery slide to the left in the figures to discharge the first set of tacks into the tubes Fig. 16 and receive the second set from the separator plate, as shown in Fig. 16.

An indicator is often used with machines of this type for the purpose of recording the amount of work done and in Figs. 1 and 2 an indicator 180 which may be of any usual form is shown as built into the machine head so that it cannot be tampered with. The actuating lever 182 of the indicator is connected by a plunger 184 with an eccentric portion of the shaft 185 of the hopper which, it will be recalled, is locked by the arm 147 to prevent it from being actuated whenever the machine is caused to repeat its operations on a shoe. By this arrangement the indicator is caused to record the number of shoes operated upon as distinguished from the number of cycles through which it is caused to run.

In the use of the machine the work may be prepared by applying the upper, linings and heel stiffener loosely to the last and the

inner sole will be placed loosely upon the last bottom in a McKay shoe, as is usual, while in making welt shoes the usual practice of tacking the innersole to the last bottom may be followed if preferred. The shoe will then be applied to the heel pin of the jack, the latter being tipped forward on its pivot 4. The toe of the shoe may then be swung under the rest 17 and the upper will be inserted in the grippers 24, 25 and pulled and the several parts of the upper materials be adjusted into proper assembled position on the last substantially as described in United States Letters Patent 855,831, for method of making shoes. When the parts of the shoe are in correct assembled relation with one another and with the general lines of the last, and the upper strained forwardly to conform it snugly to the heel portion of the last with its marginal edges held under tension, the jack will be tipped backwardly into the heel lasting mechanism. The treadle X^{54} is then depressed for starting the machine which runs through a portion of its cycle determined by the formation of the cam X^{31} and then stops automatically. As herein shown the cycle is divided into three steps and the machine comes to rest after the locking of the jack and the tightening of the heel bands and again between the second closing of the overworking wipers and the insertion of the tacks to permit the operator to inspect the work and, by hand operations, make any adjustments that may be required for securing a satisfactorily lasted heel seat. The second stop may be omitted or this stop, and also the first stop, may be optional with the operator if desired. This would permit speeding of the machine by a skilful operator and upon cheap work wherein nicety of adjustment is not required. The clutch mechanism to which reference is made is arranged to bring the machine always to a stop at the predetermined points but it may be modified so that if the workman retains his foot on the treadle the machine will skip the intermediate stops and continue running to the end of its cycle; and further the cam X^{31} may be changed to add a stop either necessary or optional between the first and the second wiping. The raising of the bottom rest and the lifting of the shoe following it by the expansion of the yielding element in the jack lifting mechanism takes place automatically between the two overworking operations of the wipers. This lifting of the shoe may be made more radical by adding to the formation of the cam face 64 in an obvious way to cause the bell crank lever 46 to be rocked before or during the second advance of the wipers and force the shoe upwardly. This change in the cam will also effect a supplemental tightening of the heel band after the breaking down of the upper caused by the first closing of the wipers and this is desirable in lasting stubborn upper materials. If the shoe is a difficult one to last the operator may suspend the driving of the tacks that are in the tack block and the delivery of a second set of tacks by shifting the hand lever 145 to set the block 140 and the stop 147. The operator will then watch the wiping over operation and if it is satisfactorily done he will withdraw the block and stop and permit the upper to be fastened by the tacks. If it is unsatisfactory the shoe will be subjected to another cycle of the machine's operation and the block and stop will be withdrawn at the proper time to permit the upper to be secured and a set of tacks fed into place to be driven into the next shoe.

Those novel features of this invention which relate only to the tacking mechanism are not claimed herein but constitute the subject-matter of a divisional application Serial No. 621,514, filed April 17, 1911.

Having explained the nature of this invention and described a construction embodying the same in the best form now known to me, I claim as new and desire to secure by Letters Patent of the United States:—

1. A machine of the class described, having in combination, a last spindle, a gripper support extended therefrom, and a gripper mounted on the support in position to pull an upper applied to a last on the spindle, said machine having means for fixing the gripper in different positions of adjustment both vertically and horizontally relatively to the last spindle for lasts of different heights and lengths.

2. A machine of the class described, having in combination, a last spindle, a gripper support extended therefrom and adjustable vertically thereon, a gripper mounted on the support, and means for fixing the gripper upon the support in different adjusted positions.

3. A machine of the class described, having in combination, a last spindle, a gripper support extended from the spindle, a gripper adapted to be fixed in different adjusted positions thereon lengthwise of the shoe, and means for actuating the gripper in its adjusted positions to pull the upper forward on the last.

4. A machine of the class described having, in combination, shoe resting means including an abutment for the toe end of the last, a gripper arranged to engage the forepart of the upper and mounted for movement longitudinally of the last away therefrom to pull the upper lengthwise, and means for actuating the gripper.

5. A machine of the class described hav-

ing, in combination, shoe resting means including abutments for the bottom and for the toe end of the last, a gripper arranged to engage the toe portion of the upper, and means for actuating the gripper forwardly and upwardly with relation to the last for pulling the upper lengthwise.

6. A machine of the class described, having in combination, a last spindle, a support extended therefrom, and an upper pulling device mounted on the support including an abutment for the last and jaws for pulling the upper forward.

7. A machine of the class described, having in combination, a last spindle, a support extended therefrom, a block mounted in the support and having an abutment for the toe end of the last, and upper pulling jaws fulcrumed in the block and arranged to pull the upper forward on the last.

8. A machine of the class described, having in combination, a last spindle, a support extended therefrom, a block mounted in the support and having an abutment for the toe end of the last, an abutment for the bottom face of the last, and gripper jaws fulcrumed in the block to pull the upper forwardly and upwardly.

9. A machine of the class described, having in combination upper pulling means comprising a rest for the toe end face of the last, a rest for the bottom face of the forepart of the last, jaws for gripping the upper, and means for moving the jaws to pull the upper forward on the last.

10. A machine of the class described, having in combination, a last support, and upper pulling means comprising an abutment for the toe end face of the last, a pivoted gripper for pulling the upper lengthwise of the last with relation to said abutment, and manually operated means for actuating the gripper.

11. A machine of the class described, having in combination, a last support, a block including an abutment for the last, grippers pivoted on the block, and a lever for closing the grippers and swinging them about their pivot to pull the upper forward.

12. A machine of the class described, having in combination, a last support, a block, grippers pivoted to the block below the last, and means for closing the grippers and rocking them about their pivot to pull the upper toeward and upward.

13. A machine of the class described, having in combination, a last support, a block, a gripper jaw pivoted to the block, a second jaw pivoted to the first, and an operating device arranged to engage the second jaw to close the jaws on the work and then rock them about the pivotal connection of the first jaw with the block.

14. A machine of the class described, having in combination, gripper jaws arranged to pull an upper, and an operating device therefor having a handle capable of independent rotation, and means controlled by said rotation for locking and unlocking the operating device.

15. A machine of the class described having, in combination, means for supporting a last in inverted position, grippers arranged to engage the toe portion of the upper, a support located below the grippers and below the last bottom and about which the grippers can have pivotal movement for pulling the upper, and means for actuating the grippers angularly about said pivot to pull the upper, the arrangement being such that the upper is bent to increase its frictional engagement with the end of the lower jaw of the grippers as the pulling movement proceeds.

16. A machine of the class described, having in combination, the shoe support 10, the gripper support 8 thereon, and the adjustable connections comprising a rack on the support 10, the toothed sleeve 11 having a hand wheel, the rod 12 having a locking head, and the spring 13 to press the hand wheel and the locking head together.

17. A machine of the class described, having in combination, the shoe support 10, the gripper support 8 thereon, the block 15 movable in the support 8, the pawl 39 for locking the block, the gripping means movable upon the block after it has been locked, and the pawl 36 for locking the gripping means.

18. In a machine of the class described, means for positioning an inverted last, a gripper arranged adjacent to the toe of the last and pivotally supported at a point below the last, and means for actuating the gripper about said pivot to pull the upper forwardly and upwardly.

19. In a machine of the class described, means for positioning an inverted last, a gripper arranged adjacent to the toe of the last, and comprising an angle lever pivoted at the lower end of the upright arm and having one of the gripping jaws on the horizontal arm, a coöperating jaw, and means for actuating the gripper about the pivotal connection of said upright arm.

20. In a machine of the class described, means for positioning an inverted last, a gripper arranged adjacent to the toe of the last, and comprising an angle lever pivoted at the lower end of the upright arm and having one of the gripping jaws on the horizontal arm, a coöperating jaw, and means acting through said coöperating jaw to close it upon the work and then move the lever about said pivotal support for the upright arm to pull the upper.

21. A machine of the class described, having in combination, means for gripping an

upper at the toe, pulling it forwardly and holding it under lengthwise tension without bending it over the toe end of the last, and means for lasting the heel seat of the shoe while the upper is thus held.

22. A shoe making machine, having in combination, means for engaging an upper, operating means for relatively moving said engaging means and the last lengthwise of the upper in the direction for straining the upper forwardly on the last, and automatically operating means for lasting the heel seat portion of the shoe.

23. A shoe making machine, having in combination, means for engaging an upper, operating means for relatively moving said engaging means and the last lengthwise of the upper in the direction for straining the upper forwardly on the last, automatically operating means for lasting the heel seat portion of the shoe, and automatically operating means for tacking the upper.

24. A shoe making machine, having in combination, means for straining an upper forwardly on a last, and means operated automatically a plurality of times over the same portion of the heel seat to wipe the upper into lasted position over the heel seat of the last.

25. A shoe making machine, having in combination, manually operated means for engaging an upper, operating means for relatively moving said engaging means and the last lengthwise of the upper in the direction for straining the upper forwardly on the last, and automatically operated means for lasting the entire heel seat portion of the shoe while the upper is held under strain.

26. A shoemaking machine having, in combination, means movable forwardly relatively to the last for straining the upper toward the toe end of the last, and mechanism operating automatically while such forward strain is maintained for lasting the heel seat portion of the shoe.

27. A shoemaking machine having, in combination, means for engaging an upper, operating means for relatively moving said engaging means and the last lengthwise of the upper in the direction for straining the upper forwardly on the last, and means for fastening the upper to the innersole on both sides of the rear part of the shoe while the forward strain is maintained.

28. A shoemaking machine having, in combination, means for straining an upper forwardly on a last, and means operating automatically to lay the upper inwardly over the last bottom on opposite sides of the rear part of a shoe and to fasten the upper on both sides while the forward strain on the upper is maintained.

29. A shoe making machine having in combination, lasting means comprising wiper plates constructed and arranged to fold in the upper about the entire end portion of a last simultaneously, means for actuating said plates to do their work, and means arranged to be automatically set in motion to fasten the upper after a predetermined number of actuations of the wiper plates.

30. A shoe making machine having in combination, lasting means comprising wiper plates constructed and arranged to fold in the upper about the entire end portion of a last simultaneously, means for actuating said plates to break the upper materials over the edge of the last, and then relatively actuate the plates and the last to press the upper down upon the last bottom, and operatively connected means for inserting fastenings to secure the upper while it is held by the wipers.

31. A shoe making machine having in combination, lasting means comprising wiper plates constructed and arranged to fold in the upper about the entire end portion of a last simultaneously, means for inserting a plurality of fastenings simultaneously to fasten the upper about the end portion of the last, and power driven means to actuate the wipers a predetermined plurality of times and then automatically start the inserting mechanism.

32. A shoe making machine, having in combination, means for gripping an upper at the toe end and pulling it to put and hold the marginal edge of the upper under lengthwise tension about the heel end of the last, means for actuating the gripper, and means for lasting the heel seat of the shoe while the upper is so held.

33. A shoe making machine, having in combination, wipers, a gripper, means for actuating the gripper to strain the upper lengthwise of the last and hold the upper with its marginal portion under tension about the heel end of the last, and means for actuating the wipers to last the heel seat end of the shoe while the upper is so held.

34. A shoe making machine, having in combination, means for engaging an upper, operating means for relatively moving said engaging means and the last lengthwise of the upper in the direction for straining forwardly the upper placed loosely on the last and holding the upper under lengthwise tension, means for lasting the heel seat, and means for fastening the heel seat portion of the upper in lasted position.

35. A shoe making machine, having in combination, means for engaging an upper, operating means for relatively moving said engaging means and the last lengthwise of the upper in the direction for straining the upper forwardly about the heel end of the last and holding it under tension, means for working the marginal portions of the upper

materials over the heel seat of the last, and means for fastening said overworked portions of the upper.

36. A shoe making machine, having in combination, means for straining an upper forwardly about the heel end of a last and holding it under tension, a heel embracing band to clamp the upper about the heel of the last, and automatically operating means for working the marginal portions of the upper materials over the heel seat of the last.

37. A shoe making machine, having in combination, means for straining an upper forwardly about the heel end of a last and holding it under tension, automatically operating means for working the marginal portions of the upper materials over the heel seat of the last, and means for fastening said overworked portions of the upper.

38. A shoe making machine, having in combination, means for straining an upper forwardly about the heel end of a last and holding it under tension, automatically operating means for working the marginal portions of the upper materials over the heel seat of the last, and automatic means for inserting a plurality of fastenings simultaneously to secure said overworked portions of the upper.

39. A shoe making machine, having in combination, means for straining an upper forwardly about the heel end of a last and holding it under tension, automatically operating means for forcing the marginal portions of the upper materials over upon the heel seat portion of the last, and power operated mechanism for relatively moving the last and said last-mentioned means in a direction for thereafter firmly pressing said material into lasted position.

40. A shoe making machine, having in combination, means for straining an upper forwardly about the heel end of a last and holding it under tension, means for forcing the marginal portions of the upper materials over upon the heel seat portion of the last and for thereafter firmly pressing said material into lasted position, and power-driven means for fastening the upper.

41. A shoe making machine, having in combination, means for pulling an upper forwardly on a last, and means arranged for operating a plurality of times automatically to wipe the upper into lasted position over the heel seat portion of the last.

42. A shoe making machine, having in combination, means for pulling an upper forwardly on a last, means arranged for operating a plurality of times automatically to wipe the upper into lasted position over the heel seat portion of the last, and means for fastening the upper.

43. A shoe making machine, having in combination, means for pulling an upper forwardly on a last, means arranged for operating a plurality of times automatically to wipe the upper into lasted position over the heel seat portion of the last, means for fastening the upper, and means for changing the relative planes of the wiping means and the shoe bottom during said wiping operations.

44. A shoe making machine having, in combination, means for pulling an upper forwardly on a last and holding it under strain out of contact with the corner formed by the bottom and end face of the toe of the last, means for clamping the upper about the heel portion of the last, and means for wiping the upper into lasted position over the heel seat of the last.

45. A shoe making machine, having in combination, means for pulling an upper forwardly on a last, means for clamping an upper about the heel portion of the last, means for wiping the upper into lasted position over the heel seat portion of the last, and means for tacking the upper.

46. A shoe making machine, having in combination, means for pulling an upper forwardly on a last, a heel embracing band, means for actuating said band forwardly and inwardly for tightening and conforming the upper materials to the last, and means for working the upper materials over upon the heel seat of the last.

47. A shoe making machine, having in combination, means for pulling an upper forwardly on a last, a heel embracing band, means for actuating said band forwardly and inwardly for tightening and conforming the upper materials to the last, and means automatically operated to wipe the upper materials repeatedly over the heel seat of the last while the last is embraced by the band.

48. A shoe making machine, having in combination, end lasting wipers constructed and arranged to wipe the entire up over the sides and end of the heel, of the shoe simultaneously and power-driven means for repeatedly actuating said wipers.

49. A shoe making machine, having in combination, end lasting wipers constructed and arranged to wipe the entire upper over the sides and end of the heel of a shoe simultaneously, and power-driven means for repeatedly actuating said wipers, said machine having provision for changing relatively the plane of action of the wipers and the position of the shoe between successive actuations of the wipers.

50. In an end lasting machine, the combination with suitably shaped and arranged wipers and supports therefor, of means for actuating the supports substantially perpendicularly to the adjacent surfaces of the last, and sliding connections to permit the side wipers to slide through their supports lengthwise of the shoe.

51. In an end lasting machine, the combination with suitably shaped and arranged wipers, of supports for the side portions of the wipers, endwise sliding connections between said supports and the wipers, and means for actuating said supports perpendicularly to the side face of the last.

52. An end lasting machine, having in combination an end wiper and two side wipers, means for actuating the end wipers lengthwise of the shoe, connections therefrom for similarly actuating the side wipers, and means for actuating the side wipers transversely of the last having provision for permitting said lengthwise movement thereof.

53. An end lasting machine, having in combination an end wiper and two side wipers, means for actuating the end wiper lengthwise of the shoe, connections therefrom for similarly actuating the side wipers, and independently yielding means for actuating the side wipers transversely of the last.

54. An end lasting machine, having in combination, end embracing wipers, means for actuating the wipers lengthwise of the last, and independently yielding means for actuating the wipers transversely of the last.

55. An end lasting machine, having in combination, the end wiper and the two side wipers connected therewith by links.

56. An end lasting machine, having in combination, the end wiper 72, the side wipers 70, and the links 71 constructed and arranged to wipe the upper over at the corners of the last between the end and side wipers.

57. A shoe making machine, having in combination, means for supporting a shoe, heel lasting means, and automatic means for actuating the lasting means a predetermined plural number of times over the same portion of the shoe bottom to work the upper over the heel seat of the last.

58. A shoe making machine, having in combination, means for supporting a shoe, heel lasting means, automatic means for actuating the lasting means a predetermined plural number of times to work the upper over the heel seat of the last, and means for changing the relative planes of the lasting means and the shoe bottom during the said actuation.

59. A shoe making machine, having in combination, means for supporting a shoe, heel lasting means, automatic means for actuating the lasting means a predetermined plural number of times to work the upper over the heel seat of the last, and means for automatically changing the relative planes of the shoe bottom and the lasting means during said actuation.

60. A shoe making machine, having in combination, means for supporting a shoe, heel lasting means, automatic means for reciprocating the lasting means a plurality of times over the shoe bottom to work the upper into lasted position, and means for automatically moving the wipers and the last bottom relatively closer together between reciprocatory movements to condense the stock against the last bottom.

61. A shoe making machine, having in combination, means for supporting a shoe, heel lasting means, automatic means for actuating the lasting means a predetermined plural number of times to work the upper over the heel seat of the last, and means for automatically raising the shoe support between two inward strokes of the lasting means.

62. In a shoe making machine, having, in combination, means for supporting a shoe, heel lasting means, automatic means for actuating the lasting means a predetermined plural number of times to work the upper over the heel seat of the last, a bottom rest for the shoe, means for uplifting the shoe support yieldingly, and means for raising the bottom rest between reciprocating movements of the wiping means.

63. A shoe making machine, having in combination, means for supporting a shoe, heel lasting means, automatic means for actuating the lasting means a predetermined plural number of times to work the upper over the heel seat of the last, a bottom rest for the shoe, means for uplifting the shoe support yieldingly, means for locking the support against depression, and means for raising the rest to permit the shoe support to rise, said locking means operating automatically to secure the support in its raised position.

64. A shoe making machine having in combination lasting means, means for actuating the lasting means to overwork the margin of the upper and press it upon the shoe bottom, a shoe bottom rest, and means for changing the plane of the lasting means and of the shoe engaging face of the bottom rest relatively after the lasting means have advanced over the shoe bottom and before the return movement of the lasting means whereby dragging action tending to displace the overworked margin of the upper is reduced or avoided.

65. A shoe making machine having in combination lasting means, means for actuating the lasting means repeatedly during a single cycle of the machine's operation to work the upper over the shoe bottom, a shoe bottom rest and means for automatically raising the bottom rest between successive actuations of the lasting means.

66. A shoe making machine having in combination means for positioning a shoe,

means for forcing an upper over the last by repeated operations on the same part of the shoe, and means for automatically raising the shoe as the overworking operation progresses.

67. A shoe making machine having in combination shoe positioning means, means for forcing the upper over the last bottom, actuating mechanism for causing the latter means to act a plurality of times upon the same portion of the shoe, and means operating automatically to change the relative planes of the last positioning means and the overworking means between successive operations of the latter.

68. A shoe making machine having in combination shoe positioning means, means operating a plurality of times on the same portion of stock for forcing the upper from the edge inwardly over the last bottom and means operating automatically to raise and lower the shoe with relation to said overworking means to vary its pressure upon the shoe.

69. A machine of the class described having in combination a working tool, actuating mechanism for causing said tool to make a plurality of complete movements over the same portion of the work during a single cycle of the machine's operation, and means for automatically changing the position of the work between movements of the tool to change the effect of the tool upon the portion of the work under treatment.

70. A shoe making machine having in combination end embracing wipers, a shoe support, tack driving mechanism, means for actuating the wipers, means for raising the shoe after the initial advance of the wipers and before the tack is driven, and means for actuating the tacking mechanism.

71. A shoe making machine having in combination wipers, a shoe support, means for actuating the wipers to break down the upper materials over the edge of the last, and means for raising the shoe, said machine having provision for automatically actuating the wipers again during the same cycle of the machine and over the same portion of the upper materials to wipe in and iron down the upper into lasted position.

72. A shoe making machine having in combination a wiper, a shoe support, tack driving mechanism, means for actuating the wipers a plurality of times during the same cycle of the machine, means for raising the shoe between actuations of the wiper, and means for actuating the tacking mechanism while the wiper holds the upper in position to be fastened.

73. A shoe making machine having in combination cooperating end lasting wipers, a shoe support, gang tacking means, and automatic actuating mechanism for said parts arranged to effect a relative movement of the last and wipers perpendicular to the plane of the last bottom during the operation of the machine.

74. A machine of the class described having, in combination, end lasting means, mechanism for moving the lasting means over a last bottom and retracting it, and means operated automatically in advance of the operation of the lasting means to level the last transversely, and again while the lasting means is over the last bottom to depress the last for relieving drag upon the upper during the return movement of the lasting means.

75. A machine of the class described having, in combination, a last support on which the last can have lateral angular positioning movement, heel lasting wipers, last positioning means constructed and arranged to engage the heel seat of the shoe at points separated laterally by a substantial distance, and means for relatively actuating said lasting wipers and the last to bring the heel seat and the wipers into substantial parallelism prior to the advance of the wipers and for further relatively actuating the wipers and the last in the direction to separate the wipers and the heel seat vertically to facilitate the retraction of the wipers.

76. A machine of the class described having, in combination, a last support on which the last can have lateral angular positioning movement, heel lasting wipers, and means arranged to engage the shoe bottom at separate points located on opposite sides of the median line of the shoe and near the edges of the innersole adjacent to the heel breast line to hold the inner-sole down in the shank during the operation of the wipers.

77. A machine of the class described having, in combination, a last support on which the last can have lateral angular positioning movement, heel lasting wipers, and means comprising relatively unyielding members arranged to engage the inner sole at opposite sides of the last near its edges to hold the innersole down upon the last bottom during the operation of the wipers.

78. A machine of the class described having, in combination, heel lasting wipers, means for automatically actuating the wipers, means for supporting the shoe arranged to permit the last to tip thereon, and means independent of the wipers serving without attention from the operator for engaging the heel seat of the shoe to tip it into position to receive the operation of the wipers.

79. A machine of the class described having, in combination, heel lasting wipers, means for automatically actuating the wipers, means for supporting the shoe arranged to permit the last to tip thereon, and

means for engaging and actuating the shoe so supported to level the heel seat of the shoe transversely in advance of the action of the wipers.

80. A machine of the class described having, in combination, heel lasting wipers presenting a substantially continuous acting edge and arranged to advance and turn to overwipe the upper upon the entire heel seat at one operation, means for automatically actuating the wipers, means for supporting the shoe, and means for engaging the shoe bottom to position the shoe vertically and adapted for movement perpendicularly to the shoe bottom during the operation of the wipers.

81. A machine of the class described having, in combination, means for supporting a shoe, heel lasting wipers mounted for reciprocation in a single plane substantially parallel with the plane of the heel seat, means for automatically operating the wipers, and means for engaging the shoe bottom to position the shoe vertically and arranged for movement to cause the shoe to be positioned differently with relation to the plane of movement of the wipers during different portions of the operation of the wipers including a movement to depress the shoe and hold it down during the retraction of the wipers.

82. A machine of the class described having, in combination heel lasting wipers, means for automatically actuating the wipers, means for supporting the shoe, means for engaging the shoe bottom to position the shoe vertically, and means for automatically raising it during the operation of the wipers.

83. A lasting machine having, in combination, a shoe support, end lasting mechanism, a shoe bottom rest formed and arranged to hold the innersole in position for the upper to be lasted over it, means for moving the shoe endwise into said end lasting mechanism, and a support for the bottom rest arranged to permit said rest to accompany the shoe in the endwise movement thereof into the lasting mechanism.

84. A machine of the class described, having, in combination, a yielding shoe support, means for operating upon the shoe, means for moving the shoe into the field of operation of the operating means, a rest to engage the bottom of the shoe and positioning it vertically with relation to the operating means, a support for said rest, and a sliding connection between the rest and its support arranged to permit the shoe to be positioned vertically before it is moved backwardly and allow the rest to accompany the shoe in its backward movement.

85. A lasting machine having means for working an upper over an innersole on a last bottom, shoe supporting means movable to present the shoe to said overworking means, an innersole clamp arranged to hold the innersole down upon the last bottom adjacent to its edge to facilitate the overworking of the upper, and means for supporting the clamp arranged to permit the clamp to accompany the shoe in the movement thereof for presenting the shoe to the overworking means.

86. A shoe making machine, having in combination, power driven mechanism for operating on a shoe, a work support sustained for swinging movement from and toward the machine and for endwise vertical movement, and connections operated automatically from said power driven mechanism for uplifting the support and pulling it toward the machine.

87. A shoe making machine, having in combination, a work support sustained for swinging movement from and toward the machine and for endwise vertical movement, and connected mechanism for uplifting the support and pulling it toward the machine, and automatically operating means to lock the support against return movement in either direction.

88. A shoe making machine, having in combination, a work support sustained for swinging movement from and toward the machine and for endwise vertical movement, and independently yielding means for simultaneously uplifting and inswinging the shoe support.

89. A shoe making machine, having in combination, a work support sustained for swinging movement from and toward the machine and for endwise vertical movement, means for operating upon the shoe, power-driven means for uplifting and inswinging the support, and means for automatically locking the support against reverse movements while the machine is running and unlocking it when the machine stops.

90. A machine of the class described, having in combination, a shoe support, means for working an upper over a last, and power-driven mechanism for forcing the last inwardly toward the machine and upwardly toward the plane of the overworking means in time relation with the lasting movements of said latter means.

91. A machine of the class described, having in combination, a shoe support, a heel embracing band, and power-driven means for actuating the shoe backwardly into the band, and simultaneously actuating the sides of the band to close against the ingoing shoe.

92. A machine of the class described, having in combination, a shoe support, a heel embracing band, and power-driven means for actuating the shoe backwardly into the band, and band operating means driven by said power means and constructed and ar-

ranged to draw the end portions of the band forwardly and simultaneously close them inwardly against the ingoing shoe.

93. A machine of the class described, having in combination, a base, a jack post pivoted on the base, a shoe supporting spindle movable endwise in the post, and provided with rack teeth adjacent said pivot, a pinion located at the pivot to engage the rack teeth and means for actuating the pinion to move the spindle vertically.

94. A machine of the class described, having in combination, a base, a jack post, pivoted on the base, a shoe supporting spindle movable endwise in the post, and provided with rack teeth, a lateral rack bar connected to the jack post, a pinion arranged to engage said bar, an actuator and independently yielding connections between the actuator and the two pinions to move the shoe supporting spindle vertically and laterally.

95. In a machine of the class described, the combination with mechanism for working on a shoe, of a last supporting spindle, and means for actuating it in two directions toward said mechanism comprising the actuator 46, the cranks 44 having lost motion with relation to the actuator, the springs 45 between the cranks and the actuator, and separate connections from the cranks to the last spindle substantially as shown and described.

96. In a machine of the class described, a shoe support, an end embracing band, means for moving the shoe backwardly into the band and operatively connected means for actuating the band forwardly in frictional contact with the sides of the shoe.

97. In a machine of the class described, a shoe support, a heel embracing band, means for putting the upper under lengthwise forward tension, and means for moving the shoe backwardly into the band whereby the frictional engagement of the band with the upper assists in stretching the upper forwardly.

98. In a machine of the class described, a shoe support, a heel embracing band, means for putting the upper under lengthwise forward tension, means for moving the shoe backwardly into the band, and means for actuating the band forward in frictional contact with the upper on the sides of the heel to assist in stretching and conforming the upper to the contour of the last.

99. A machine of the class described, having in combination, means for supporting a shoe, and means for conforming the upper to the contour of the heel portion of the last, comprising a plurality of parallel independently extensible cords arranged to embrace the heel portion of the shoe.

100. A machine of the class described, having in combination, means for supporting a shoe, and means for conforming the upper to the contour of the heel portion of the last comprising a plurality of parallel independent cords arranged to embrace the heel portion of the shoe, and means for actuating said cords inwardly and forwardly.

101. A machine of the class described, having in combination, means for supporting a shoe, and means for conforming the upper to the contour of the heel portion of the last comprising a plurality of parallel, independently extensible cords arranged to embrace the heel portion of the shoe, and actuating means constructed and arranged to apply forward tension to the cords while closing them inwardly about the sides of the heel portion of the last.

102. A machine of the class described, having in combination, an end embracing band and operating devices for closing the band, including levers comprising two members which are pivotally connected and relatively yielding, said levers being constructed and arranged to project forwardly the ends thereof which are connected to the band when the band contacts with the sides of the shoe.

103. A machine of the class described, having in combination, an end embracing band and operating devices for closing the band including the levers 54 having the pivoted blocks 52 mounted to yield thereon and arranged to begin actuating the band forwardly when the band engages the work in its closing movement.

104. A machine of the class described, having in combination, an end embracing band and operating devices for closing the band arranged to close the sides of the band toward the sides of the shoe without substantial forward movement until the shoe is engaged and then to begin automatically to tension the band forwardly in contact with the upper on the sides of the last.

105. In an apparatus of the class herein described, means for conforming an upper to a last having an innersole upon its bottom face, said apparatus having provision for acting upon the innersole at its two ends to position it lengthwise.

106. In an apparatus of the class herein described, means for conforming an upper to a last, having an innersole upon its bottom face, said apparatus having provision for acting upon the innersole at its two ends to position it lengthwise and being adapted to bow the sole down into the shank of the last bottom.

107. In an apparatus of the class herein described, means for engaging the forward portion of an innersole on a last bottom, and means for putting an upper under tension about the heel portion of the last and crowding the innersole forwardly to cause it to fit down into the shank of the last.

108. In an apparatus of the class herein

described, an abutment for the toe end of an innersole, and means for clamping the innersole down upon the last bottom to hold it in adjusted relation to said abutment.

109. In an apparatus of the class herein described, means for engaging the innersole on a last bottom forward of the shank of the last and adapted for movement to push the innersole backwardly, and means to effect a forward movement of the heel portion of the innersole whereby it is forced downwardly into the shank of the last.

110. In an apparatus of the class herein described, means for engaging the innersole on a last bottom forward of the shank of the last and adapted for movement to push the innersole backwardly, means to effect a forward movement of the heel portion of the innersole whereby it is forced downwardly into the shank of the last, and means for lasting the heel portion of the shoe while the innersole is so held.

111. In an apparatus of the class herein described, the rest 17 for engaging the forward portion of the innersole upon a last, the movable carrier 15 for the rest by which it may be caused to push the innersole backwardly, the stop 19, the grippers for putting the upper under forward tension about the heel portion of the last whereby the end of the innersole projecting rearwardly beyond the end face of the last is crowded forwardly while the forward portion is held by the rest 17, and operating means 28, 26 for the rest carrier and the grippers.

112. A machine of the class described having in combination, end lasting wipers and gang tacking mechanism arranged to locate the tacks inside the edges of the wipers at opposite sides of the shoe and to drive the tacks in a direction inclined inwardly whereby the ingoing tacks shall draw the upper inwardly from the opposite edges of the shoe or take up the slack that may exist between the line of tacks and the edge of the wipers.

113. A machine of the class described having means for working an upper into position to be fastened, automatically operating means for driving tacks to fasten the upper, and a device adapted to be set by the workman to prevent the driving of the tacks in a cycle of the machine's operation, said machine having provision for automatically resetting said device to permit the insertion of the tacks in the next cycle.

114. A machine of the class described having in combination, heel lasting wipers for forcing an upper over a last, a gang tacker to fasten the upper, the shouldered bar 130, arranged for movement in the tacking operation, the forked slide 140 adapted to be positioned for preventing such movement of the bar, and the hand lever 145 arranged to control the position of the slide 140 substantially as and for the purpose described.

115. A machine of the class described having in combination, mechanism for working stock into position to be fastened, mechanism for feeding and inserting fastenings, power driven means for actuating said mechanism having provision for permitting the operator to inspect the work between the stock working and fastening operations, and means controlled by the operator to prevent the driving of the fastenings during the completion of the machine's cycle if the upper is not properly overworked.

116. A machine of the class described having in combination, mechanism for working stock into position to be fastened, mechanism for feeding and inserting fastenings, power driven means for actuating said mechanisms having provision for permitting the operator to inspect the work between the stock working and fastening operations, and means controlled by the operator to prevent the driving of the fastenings during the completion of the machine's cycle if the upper is not properly overworked, and also to prevent the feeding of more fastenings until the waiting fastenings have been driven.

117. A machine of the class described having in combination, mechanism for working stock into position to be fastened, mechanism for feeding and inserting fastenings, power driven means for actuating said mechanism having provision for permitting the operator to inspect the work between the stock working and fastening operations, and means controlled by the operator to prevent the driving of the fastenings during the completion of the machine's cycle if the upper is not properly overworked, said machine having provision for automatically resetting said manually controlled means to cause the driving of the fastenings in the next cycle.

118. A machine of the class described having in combination, mechanism for working stock into position to be fastened, mechanism for driving tacks to fasten the stock, power driven means for actuating said two mechanisms, and means arranged to be manually adjusted to prevent the driving of tacks during one cycle and to be readjusted automatically to allow the driving of the tacks in the next cycle.

119. A machine of the class described, having in combination, mechanism for working stock into position to be fastened, mechanism for feeding and driving tacks to fasten the stock, power driven means for actuating said two mechanisms, and means arranged to be manually adjusted to prevent the feeding of tacks during one cycle and to be readjusted automatically to allow the feeding of the tacks in the next cycle.

120. A machine of the class described, having in combination, means for positioning stock to be fastened, means for fastening the stock, power driven mechanism for actuating said two means having provision for permitting the work to be inspected between the stock positioning and fastening operations, and means under control of the operator to delay the fastening operation and cause the positioning operation to be repeated.

121. A machine of the class described, having in combination, means for positioning stock to be fastened, means for fastening the stock, power driven mechanism for actuating said two means having provision for permitting the work to be inspected between the stock positioning and fastening operations, and means under control of the operator to delay the fastening operation until the positioning operation has been repeated, said machine having provisions for them automatically fastening the stock.

122. A lasting machine having in combination, end lasting means, upper fastening means, power driven mechanism for actuating said two means having provision for permitting the work to be inspected between the operations of the two means, and means under control of the operator to cause the lasting means to repeat its operation before the fastening operation takes place.

123. A lasting machine having in combination end lasting means, upper fastening means, power driven mechanism for actuating said two means having provision for permitting the work to be inspected between the operations of the two means, said machine having provision for causing the lasting mechanism to repeat its power driven operation before the fastening operation takes place.

124. A lasting machine having holding means for engaging the upper and lower sides of a shoe, end lasting wipers, a gang tacker and automatically operated means to actuate the wipers repeatedly and then come to rest before the tacker is operated, said machine having provision for causing at the will of the operator a further operation of the wipers before the tacker fastens the upper.

125. A lasting machine having holding means for engaging the upper and lower sides of a shoe, end lasting wipers, a tacker and automatically operated means to advance the wipers repeatedly, and then come to rest before the tacker is operated, said machine having provision for preventing the fastening of the upper in the first cycle of the machine, and repeating the cycle for further over-working and then fastening the upper while the holding means continues to maintain the shoe in operative relation to the wipers.

126. A machine of the class described, having in combination, means for gripping the forward portion of an upper to pull it forwardly on a last and hold it under lengthwise tension, a heel embracing band and means for actuating said band forwardly and inwardly for tightening and conforming the upper materials to the heel portion of the last while they are so held by the pulling means.

127. A machine of the class described, having in combination, means for gripping the forward portion of an upper and pulling it to put and hold the rear portions of the upper under lengthwise strain about the heel portion of the last while said rear portions are free to conform to the contour of the last and means for thereafter embracing the heel portion of the shoe to clamp said rear portions of the upper to the last.

128. A machine of the class described, having in combination, means for pulling a loose upper to conform it to the rear portion of a last, a flexible heel embracing band, and means to actuate it thereafter for clamping the upper to the last.

129. A machine of the class described, having in combination, grippers arranged to close upon the upper with the plane of their gripping faces substantially in the plane of the line of strain to be effected, and means for actuating the grippers angularly in a direction tending outwardly away from the last as they pull to bend the upper across the end of one of the jaws whereby the holding force of the jaws is increased with the increase in the tension applied.

130. A machine of the class described, having in combination, grippers arranged to close upon the upper with the plane of their gripping faces substantially in the plane of the line of strain to be effected, and means for actuating the jaws angularly about a fixed pivot located near the jaws and below the plane of the shoe bottom to effect the pulling strain.

131. A machine of the class described, having in combination, means for supporting a last in inverted position, grippers pivotally supported below the plane of the last bottom to grip the toe portion of the upper, means for actuating the grippers about said pivotal support to pull the upper and means engaging the toe portion of the last to hold it during the upper pulling operation.

132. A heel wiper mechanism comprising side wipers, an end wiper, means connected with said three wipers to actuate them respectively transversely and lengthwise of the last and links forming corner wipers connecting the side and end wipers and partaking of the movements of both.

133. A heel wiper mechanism comprising side wipers, an end wiper, means connected

with said three wipers to actuate them respectively transversely and lengthwise of the last and links forming corner wipers connecting the side and end wipers and partaking of the movements of both, and supplemental means for actuating the links toward the corners of the heel.

134. A heel wiper mechanism comprising side wipers, an end wiper, means connected with the side wipers to actuate them transversely of the last bottom, links forming corner wipers between the end and side wipers; means connected with the end wiper for actuating all the wipers lengthwise of the shoe, and supplemental means for actuating the corner wipers obliquely transversely of the shoe.

135. An end lasting mechanism having in combination, opposed side wipers, end wiping means, intermediate corner wipers, means for actuating all the wipers lengthwise of the shoe, means for actuating the side wipers transversely of the shoe and means for actuating the corner wipers obliquely of the shoe.

136. An end lasting mechanism having in combination; opposed side wipers, an end wiper, intermediate corner wipers, means for actuating all the wipers lengthwise of the shoe, means for actuating the side wipers transversely of the shoe and means for actuating the corner wipers obliquely of the shoe, the means for actuating the several wipers being arranged to yield independently.

137. A machine of the class described, having end lasting wipers and automatically operating means for actuating the wipers over the same portion of the work repeatedly, said machine being constructed and arranged to give different characteristics to successive wiping operations over the work.

138. A machine of the class described, having end lasting wipers and means for automatically advancing the wipers repeatedly over the same portion of the shoe to do their work, said machine having provision for advancing the wipers at different speeds in successive actuations.

139. A machine of the class described, having end lasting wipers and means for automatically advancing the wipers repeatedly over the same portion of the shoe to do their work, said machine having provision for advancing the wipers in different planes automatically determined in successive actuations.

140. A machine of the class described, having end lasting wipers and means for automatically advancing the wipers repeatedly over the same portion of the work and stopping them in holding relation to the overworked upper of the shoe.

141. A machine of the class described, having end lasting wipers and means for automatically advancing the wipers and stopping them in partially retracted position to hold the upper while tacks are inserted in a portion of the upper uncovered by said partial retraction of the wipers.

142. A machine of the class described, having in combination, a wiper, a tacker and automatically operating mechanism to advance the wiper and partially retract it, said machine having provision for stopping the moving parts with the wiper holding the upper and then restarting to drive the tacks.

143. A machine of the class described, having in combination, end lasting wipers, an end embracing band, and automatically operating means to close the band and then actuate the wipers.

144. A machine of the class described, having in combination, end lasting wipers, an end embracing band, and automatically operating means to close the band and then repeatedly actuate the wipers over the shoe bottom while the band clamps the shoe.

145. A machine of the class described, having in combination, end lasting wipers, an end embracing band, and automatically operating means to close the band and then repeatedly actuate the wipers, said machine having provision for further tightening the band between actuations of the wipers.

146. A machine of the class described, having in combination, end lasting wipers, an end embracing band, and automatically operating means to close the band and then repeatedly actuate the wipers, said machine having provision for raising the shoe and the band while the wipers are being repeatedly actuated.

147. A machine of the class described, having in combination, end embracing wipers, means for automatically closing the wipers over the shoe bottom to do their work and thereafter withdrawing them, and means for automatically moving the shoe and the wipers relatively in a direction perpendicular to the last bottom to relieve the pressure of the wipers on the upper before they are withdrawn.

148. A machine of the class described, having in combination, heel embracing wipers, means for automatically closing the wipers over the shoe bottom, means for fastening the upper while it is held by the wipers, and means for automatically moving the shoe and the wipers relatively in a direction to relieve the pressure of the latter before the wipers are retracted.

149. A machine of the class described, having in combination, a wiper, a tacker and automatically operating mechanism to advance the wiper, partially retract it, insert a tack and then complete the retraction of the wiper.

150. A machine of the class described,

having in combination, a wiper, a tacker and automatically operating mechanism to advance the wiper, partially retract it, insert a tack, relieve the pressure of the wiper and then complete its retraction.

151. A machine of the class described, having in combination, a wiper, a tacker and connected operating mechanism to advance the wiper, back it to uncover the tacking line while still holding the stock, insert a tack and then complete the retraction of the wiper.

152. A machine of the class described, having in combination, a wiper to force shoe upper stock into position to be fastened over the bottom of a last, and means for actuating the wiper having provision for automatically retracting the wiper through a part only of its return movement and then pausing to uncover the fastening point while the wiper continues to hold the upper.

153. A machine of the class described having in combination, a wiper to force shoe upper stock into position to be fastened over the bottom of a last, and means for advancing the wiper constructed and arranged to effect automatically a slight retraction of the wiper at the end of the forward stroke of the actuating means to permit a fastening to be inserted at a point covered by the wiper in its most advanced position.

154. A machine of the class described having in combination, end lasting wipers for closing over a last bottom, means to limit the closing of the wipers and actuating means for the wipers including means becoming operative automatically to retract the wipers partially after the limiting means has become operative.

155. A machine of the class described, having in combination, end lasting wipers, means for limiting the closing of the wipers in accordance with the size of the shoe, and actuating means for the wipers having provision for automatically backing the wipers to uncover enough of the wiped in portion of upper to receive the tacks.

156. A machine of the class described, having in combination an extensible heel band, power operated means for forcing the shoe yieldingly back into said band, and additional means for limiting the backward movement of the shoe.

157. A machine of the class described, having in combination, lasting devices, an extensible heel band, means for forcing the shoe backwardly into said band, and means in addition to said band and forcing means for limiting the movement of the shoe to determine its position with relation to the lasting devices.

158. A machine of the class described, having in combination, devices for operating on a shoe, a heel band supported to permit lateral movement, means for forcing the shoe into said band and means supplemental to the heel band constructed and arranged to center the shoe with relation to the devices for operating on the shoe.

159. A machine for working an upper over a last having, in combination, power operated means for working the margin of the upper over upon the innersole, power operated upper securing means, said two means normally and automatically operating successively on a shoe, operating mechanism therefor constructed and arranged to permit the operation of said overworking means to be repeated on the same shoe while held continuously in position for such operation, before the securing means operates, and means under control of the operator for rendering said securing means inoperative.

160. In a machine of the class described, a lasting device, a lever that is movable about its fulcrum for actuating said device, said lever being also partially rotatable about its longitudinal axis, a locking plate, and a connection between said lever and plate adapted to be actuated by said partial rotation to lock and release the lever.

161. A shoe making machine having in combination, a wiper, means for actuating the wiper over the shoe bottom inwardly from the shoe edge and means for automatically depressing the shoe before the retraction of the wiper.

162. A shoe making machine having in combination, end lasting wipers, means for advancing them to work the upper over the end portion of the last, and means operating automatically to move the wipers and the last relatively before the wipers are retracted to relieve the drag of the wipers over the upper while they are being retracted.

163. A shoe making machine having in combination, end lasting wipers, means for actuating them to do their work, shoe positioning means, and means for actuating said positioning means automatically in time relation with the backward movement of the wipers to relieve the pressure of the wipers on the upper before the wipers are retracted.

164. A shoe making machine having in combination, a wiper, a vertically movable shoe support, a hold down for the shoe, means for actuating the wiper and means for automatically actuating the hold down upwardly and then downwardly again between the initial advance of the wiper and the final retraction of the wiper.

165. A shoe making machine having in combination, a wiper, a hold down for the shoe, means for actuating the wiper and means for automatically actuating the hold down upwardly before an advance of the

wipers and lowering the hold down to depress the shoe for the return movement of the wipers.

166. A machine of the class described, having in combination, means for supporting a last in inverted position, grippers, means for guiding and actuating the grippers to strain the upper lengthwise of the last in substantially right lines from the grippers to the heel, and means for lasting the heel portion of the shoe while the upper is held under such strain.

167. A lasting machine having in combination, lasting means, a back stop to position the shoe and means to adjust the back stop for shoes of different sizes including provision for indicating the correct adjustment for particular sizes.

168. A machine of the class described having in combination, heel seat lasting wipers including coöperating lasting plates and gang tacking mechanisms and a back stop adjustable to different positions for shoes of different sizes.

169. A shoe lasting mechanism having in combination, an end embracing band, devices for supporting and actuating the band to embrace a shoe, and independently yielding clamps acting through the band at a plurality of points in its length to compress the upper materials against the sides of the last.

170. A shoe lasting mechanism having, in combination, an end embracing band, and means for supporting and operating the band to embrace a shoe, including a pressure applying device at each side of the shoe formed to act upon the band near its upper edge and also at a separate point below said edge and pivoted between said edges to equalize the pressure.

171. A shoe lasting mechanism having, in combination, an end embracing band, and means for supporting and operating the band to embrace a shoe, including a pressure applying device comprising a carrier having horizontal arms swiveled on a vertical axis and a member having upper and lower pressure applying faces swiveled on each arm between said upper and lower faces for the purpose described.

172. A shoe lasting mechanism having in combination, an end embracing band, means for supporting and actuating the band to embrace the shoe, and additional means comprising swiveled clamping blocks each representing a plurality of separate contact points arranged to act through the band to assist in clamping the upper materials against the sides of the last.

173. A shoe lasting mechanism having in combination, means for supporting a shoe, end lasting devices to work the upper over the heel portion of the last, upper clamping means comprising a plurality of clamping members distributed about the heel portion of the shoe, and means for relatively actuating said members and the last to conform the upper to the side faces of the last.

174. A shoe lasting mechanism having in combination, a clamp comprising a swiveled block forked to embrace the heel end of the last and having shoe engaging members swiveled to the block and each provided with an upper and a lower contact surface, and means for relatively actuating the clamp and the shoe to compress the upper materials against the last substantially as and for the purpose described.

175. A machine of the class described having in combination, end lasting means and shoe clamping means comprising opposed arms arranged to swing toward and from the shoe, blocks swiveled on vertical axes on said arms and contact members swiveled on horizontal axes on said blocks to engage the shoe at points spaced apart lengthwise of the shoe.

176. A machine of the class described having in combination, end lasting means and shoe clamping means comprising opposed arms arranged to swing toward and from the shoe, blocks swiveled on vertical axes on said arms and contact members swiveled on horizontal axes on said blocks and having shoe engaging faces spaced apart vertically for the purpose described.

177. In a machine of the class described, a shoe clamping member comprising the swiveled block 692 having lateral converging arms, and contact members 693 swiveled in said arms on lengthwise axes and having engaging faces formed to insure contact with the upper at the upper and lower ends of said faces.

178. A machine of the class described having, in combination, means for use in assembling a shoe, including means movable lengthwise of the shoe for putting the upper under forward tension about the heel portion of the last and holding the parts of the upper in assembled relation by such tension, and means for lasting the heel seat portion of the shoe while the parts are so held.

179. A machine of the class described having, in combination, means for use in assembling a shoe, including means for gripping the forward portion of the upper and movable lengthwise of the shoe for pulling it to put the upper under forward tension about the heel end of the last and hold the parts of the shoe in assembled relation to the last by such pulling tension, and heel seat lasting mechanism arranged to operate on the shoe while the parts are so held.

180. A machine of the class described having, in combination, means for supporting a last, end embracing wipers, and automatically operated mechanism constructed and arranged to work the entire end portion of the upper into lasted position under pres-

sure serving to compact the overworked upper upon the last bottom, and thereafter to relieve the pressure and subsequently to withdraw the wipers, all in a single operation of the machine.

181. A machine of the class described having, in combination, means for supporting a shoe, end embracing wipers adapted to work the upper into lasted position over the entire heel seat of the shoe at one operation of the machine, tacking mechanism, and power operated mechanism to move the wipers forwardly and backwardly over the same portion of the shoe and bring the wipers automatically to rest in a position to hold the overwiped upper while the upper is being fastened by the tacking mechanism and thereafter to operate the tacking mechanism.

182. A machine of the class described having, in combination, means for supporting a shoe, end lasting wipers, and power driven means constructed and arranged to reciprocate the end lasting wipers over the same portions of the shoe bottom repeatedly.

183. A machine of the class described having, in combination, means for supporting a shoe, end lasting wipers, and power driven means constructed and arranged to reciprocate the end lasting wipers over the same portion of the shoe bottom a predetermined plural number of times.

184. A machine of the class described having, in combination, means for supporting a shoe, end lasting wipers, and power operated mechanism constructed and arranged to reciprocate the wipers over the shoe bottom and to bring the wipers to rest automatically in a partially retracted position to permit the shoe upper to be fastened while it is held by the partially retracted wipers.

185. A machine of the class described having, in combination, means for supporting a shoe, end lasting mechanism including end embracing wipers, power operated mechanism constructed and arranged to cause the wipers to force the margin of the entire end portion of the upper into lasted position over the shoe bottom and then partially to retract the wipers and automatically bring the wipers to rest in a predetermined position holding the upper to permit it to be fastened, and means for fastening the upper inside the edges of the partially retracted wipers while the lasting mechanism holds the upper.

186. A machine of the class described having, in combination, means for supporting a shoe, end lasting wipers constructed and arranged to work the upper into lasted position over the entire end portion of the shoe at a single operation, a gang tacker, and connected mechanism to actuate said lasting and tacking instrumentalities to last and tack an end portion of a shoe at a single operation.

187. A machine of the class described having, in combination, means for supporting a shoe, heel lasting mechanism constructed and arranged to work the upper into lasted position over the entire heel seat portion of the shoe at a single operation, automatic operating mechanism therefor having provision for stopping at a predetermined point in its cycle for holding the upper in lasted position while it is tacked, and means for tacking the upper while it is so held.

188. A machine of the class described having, in combination, last supporting means, heel lasting wipers, and automatically operating mechanism to advance the wipers repeatedly and to raise the last support while the wipers are at one end of their movement.

189. A machine of the class described having, in combination, last supporting means, heel lasting wipers constructed and arranged to work an upper into lasted position over the entire heel seat portion of the shoe at a single operation and having stock flattening faces extending substantially continuously around the heel seat, and power operated mechanism to advance and retract the wipers and positively to effect a relative movement of the wipers and the last perpendicularly to the plane of said stock flattening faces to relieve the drag of the wipers during their retracting movement.

190. A machine of the class described having, in combination, a heel embracing band, heel lasting wipers, and power driven means to actuate said band and wipers in time relation to seize a shoe, shape the upper materials to the heel portion of the last, come to rest to permit the upper to be fastened and, when restarted, to relieve the shaping pressure and then return to shoe receiving relation.

191. A machine of the class described having, in combination, a heel embracing band, heel lasting wipers, and automatic operating means to close the band, repeatedly actuate the wipers, and then open the band.

192. A machine of the class described having, in combination, a heel embracing band, heel lasting wipers, and automatic operating means to close the band, actuate the wipers, tighten the band, and repeat the actuation of the wipers.

193. A machine of the class described having, in combination, a heel embracing band, heel lasting wipers, and automatic operating means to close the band, actuate the wipers, change the relative planes of the shoe bottom and the wipers, tighten the band, and repeat the actuation of the wipers.

194. A machine of the class described having, in combination, a heel embracing band, heel lasting wipers, and automatic operating

means to close the band, advance and retract the wipers, and open the band, said machine having provision for relatively moving the wipers and the shoe vertically while the band is closed.

195. A machine of the class described having, in combination, automatically actuated end lasting wipers, and automatically actuated tacking devices operatively connected therewith.

196. A machine of the class described having, in combination, automatically actuated end lasting wipers, and a gang tacker operated automatically in time relation with the wipers.

197. A machine of the class described having, in combination, means to pull an upper forwardly on a last and hold it under tension, operating devices to move said pulling means lengthwise of the last for stretching the upper and controlling its position during the heel seat lasting operation, and means for lasting the heel portion of the shoe while the upper is so held.

198. A machine of the class described having, in combination, means movable lengthwise of a last to pull an upper forwardly on the last and hold it under tension, and means operated automatically for lasting the heel portion of the shoe while the upper is so held.

199. A machine of the class described having, in combination, means engaging the forepart of an upper and movable lengthwise of a last to put the upper under forward tension about the heel portion of the last, additional means to clamp the upper about the heel portion of the last, and means for forcing the upper into lasted position upon the heel seat.

200. A machine of the class described having, in combination, means to put an upper under forward tension about the heel portion of the last, additional means to clamp the upper about the heel portion of the last, means for lasting the heel, and means for tacking the shoe to hold the upper.

201. A machine of the class described having, in combination, means to put an upper under forward tension about the heel portion of a last, and power driven mechanisms for overwiping and tacking the upper at the heel seat while it is so held under tension.

202. A machine of the class described, having, in combination, means for adjusting relatively an upper, a heel stiffener and an innersole into assembled relation and for working said parts into lasted relation over the heel part of the last, and means for securing the parts together over the portion lasted.

203. A machine of the class described, having, in combination, means for adjusting relatively an upper, a heel stiffener and an innersole into assembled relation and for automatically working said parts into lasted relation over the heel part of the last, and means for securing the parts together over the portion lasted.

204. A machine of the class described, having, in combination, means for adjusting relatively an upper, a heel stiffener and an innersole into assembled relation and for automatically working said parts into lasted relation over the heel part of the last, and means for automatically securing the parts together over the portion lasted.

205. A machine for operating upon parts of a shoe arranged upon a last, having, in combination, means for moving an innersole rearwardly upon a last, means for pressing a heel stiffener against the end and sides of the last, and means for securing the sides of the stiffener to the innersole.

206. A machine of the class described, having, in combination, automatic means for pressing a heel stiffener against the opposite sides of a last simultaneously, and an automatic means for thereafter securing the sides of the stiffener to an innersole carried by the last.

207. A machine of the class described, having, in combination, means for pressing a heel stiffener against the opposite sides of a last simultaneously, means for thereafter securing the sides of the stiffener to an innersole carried by the last, and means for bringing successively into operation said pressing means and securing means.

208. A gang heel seat fastening machine having, in combination, a gang of tackers, a shoe support, an end embracing band, and power mechanism for drawing the shoe support into the band and raising it to the working position and then coming automatically to rest, and means operating in time relation when the machine is restarted to compress the stock upon the last bottom and then effect insertion of the tacks.

209. A gang heel seat fastening machine having, in combination, a gang of tackers, a shoe support, end lasting means, and power mechanism for drawing the shoe support into the end lasting means and raising it to the working position and for actuating the tackers.

210. An end lasting mechanism having, in combination with suitable operating mechanism, heel embracing wipers comprising at each side of the heel three members connected for pivotal movement relatively, and means for directing such relative movement.

211. An end lasting mechanism having, in combination with suitable operating mechanism, heel embracing wipers comprising at each side of the heel rear end, corner and side members connected together for relative

pivotal movement and means for directing each member in a path differing from that of the others and adapted to the portion of the heel edge across which it is to operate.

212. An automatic heel seat laster having, in combination, a last support, heel embracing wipers for engaging and wiping over simultaneously the upstanding portions of the upper at both sides of the heel portion of the shoe, power operating mechanism for the wipers, guiding means for confining the wipers to movement in a single plane, means engaging the shoe bottom and determining its height relative to the plane of the wipers, a last support to uphold the shoe, and operating means to press the shoe up against the bottom engaging means and which is movable during the power operation of the machine to change the vertical relation of the shoe to the wipers.

213. An automatic end lasting machine having, in combination, end lasting wipers, guiding means for the wipers, power operating mechanism for advancing and closing the wipers a plurality of times over the same portion of the upper in lasting a single shoe, and means for changing the vertical position of the shoe with relation to the wipers between one advance of the wipers and their next automatically effected advance over the shoe bottom.

214. A heel seat forming machine having, in combination, a shoe support comprising a heel seat inside shaping member, end embracing wipers movable thereover to shape the flange of the upper, and power mechanism for operating said wipers to shape the flange and operating to release the shaping pressure prior to the retraction of the wipers to relieve outward drag on the shaped flange.

215. A shoemaking machine having, in combination, heel seat forming means including an inside former, heel embracing wipers, means for relatively moving the wipers and the former to turn the margin of an upper inwardly upon the heel seat face of the former and shape it under pressure and to return to starting position, and means for relatively moving the wipers and the former substantially perpendicularly to the plane of the heel seat face of the former prior to said return movement to prevent outward drag on the upper.

216. A machine of the class described having, in combination, a shoe holder and devices for maintaining the shoe stock in condition for the operation of tackers thereon, a plurality of tackers, power operated means for relatively moving the tackers and the shoe holder into position for the tackers to insert the tacks, and means controlled by the operator for modifying the normal sequence of the operations and causing the power means to complete its cycle without driving the tacks and while said holder and devices retain their control of the shoe stock.

217. In a machine of the class described, shoe holding means including means for maintaining the shoe upper in position for fastening, upper securing devices, and power operated means therefor; and controlling means arranged for manual operation to determine for each shoe, after the operation of the machine has been commenced, whether the upper shall be secured or the machine shall be permitted to repeat its cycle upon the shoe so held by the first-mentioned means before the upper is secured.

218. A heel seat lasting machine having, in combination, a gage to position the toe end of an innersole flush with the toe end of the last, means to position the heel end of the innersole flush with the heel end of the last, means to bow the innersole down into the shank of the last and clamp the heel seat portion of the innersole down upon the last bottom at opposite sides near the breast line, and a plurality of fastening applying devices movable inwardly over the heel seat in converging lines and operating to fasten the upper along the margin of the heel seat.

219. A machine of the class described having, in combination, a gage to position the toe end of an innersole flush with the toe end of a last, means to position the heel end of the innersole flush with the heel end of the last, means to bow the innersole down into the shank of the last, and means for fastening the shoe upper to the heel seat portion of the innersole.

220. A machine of the class described having, in combination, means for operating on a shoe, and means for positioning the shoe comprising a heel pin, a spring arranged to rock the heel pin in the direction for tipping the toe end of the shoe upwardly, and a rest to engage the bottom face of the last to limit said movement of the toe end of the shoe and locate the bottom face of the last for the action of said operating means upon the shoe.

221. A machine of the class described having, in combination, means for supporting a shoe, and a gripper operatively connected with the shoe support and arranged in position to engage the forepart of the shoe upper and stretch the upper lengthwise of the last, said toe gripper being adjustable in a vertical path to compensate for differences in the angular relation of the plane of the heel seat of the last to the plane of the forepart of the last and effect proper drafting of the upper.

222. A machine of the class described having, in combination, a last support, a mold comprising coöperating jaws, heel seat wipers, and connected mechanism for actu-

ating the jaws to clamp the upper materials against the side faces of the last with molding pressure and to actuate the support and wipers to compress the heel seat and come to rest with the shoe under pressure in the mold.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RONALD F. McFEELY.

Witnesses:
CHARLES H. HOYT,
LEONARD M. JOHNSON.

Corrections in Letters Patent No. 1,129,881.

It is hereby certified that in Letters Patent No. 1,129,881, granted March 2, 1915, upon the application of Ronald F. McFeely, of Beverly, Massachusetts, for an improvement in "Machines for Use in the Manufacture of Boots and Shoes," errors appear in the printed specification requiring correction as follows: Page 5, line 31, for the word "blocks" read *block;* page 6, line 89, for the word "rigid" read *right;* page 12, line 82, strike out the word "In" first occurrence and make the article "a" a capital letter; page 20, lines 55–56, for the word "representing" read *presenting;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of September, A. D., 1915.

[SEAL.]

J. T. NEWTON,
Acting Commissioner of Patents.

308

J. CAVANAGH.

END LASTING MACHINE.

APPLICATION FILED APR. 28, 1911.

1,130,142.

Patented Mar. 2, 1915.

2 SHEETS—SHEET 2.

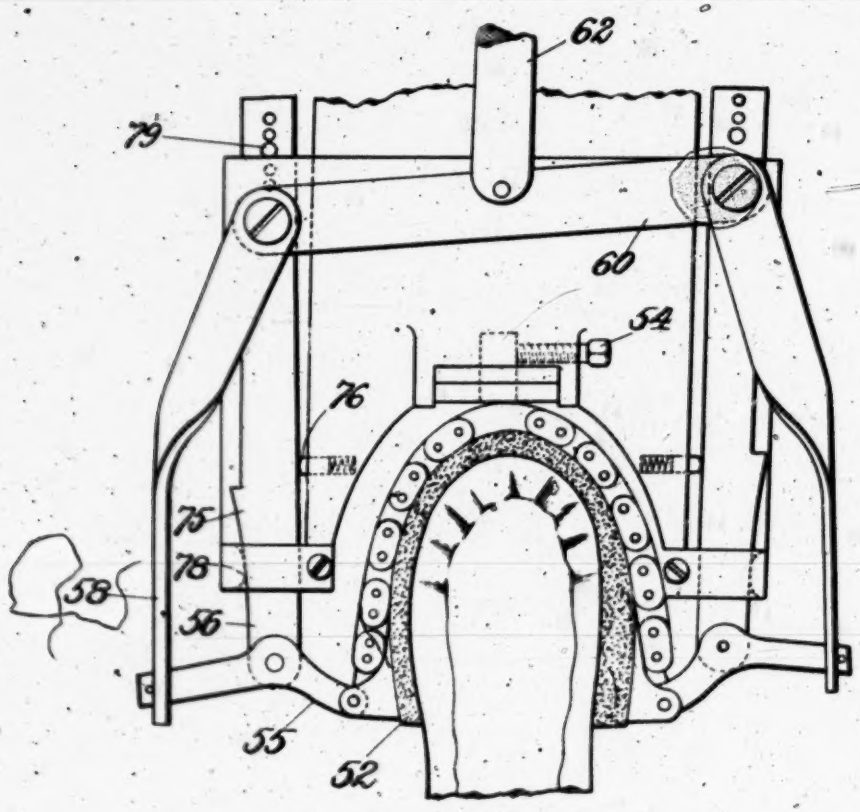


Fig. 2.

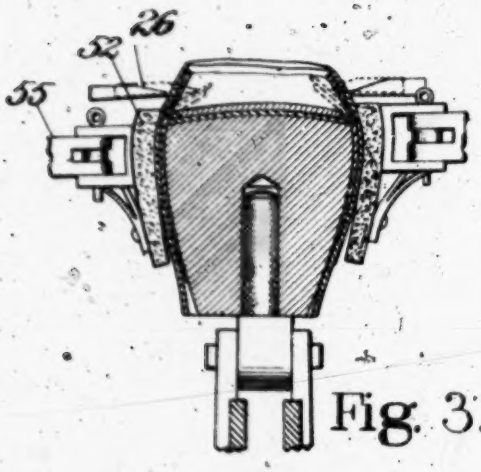


Fig. 3.

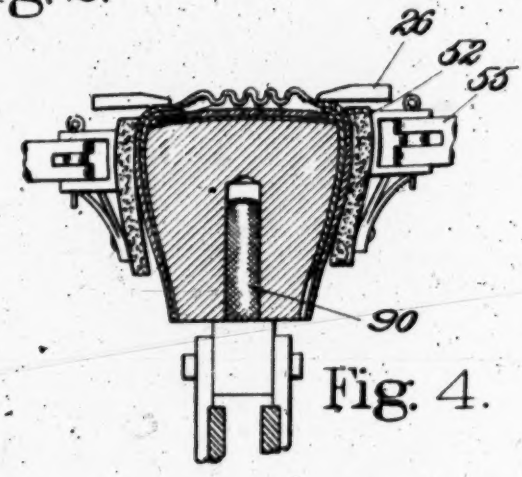


Fig. 4.

WITNESSES

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310

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END LASTING MACHINE.

APPLICATION FILED APR. 28, 1911.

1,130,142.

Patented Mar. 2, 1915

2 SHEETS—SHEET 1.

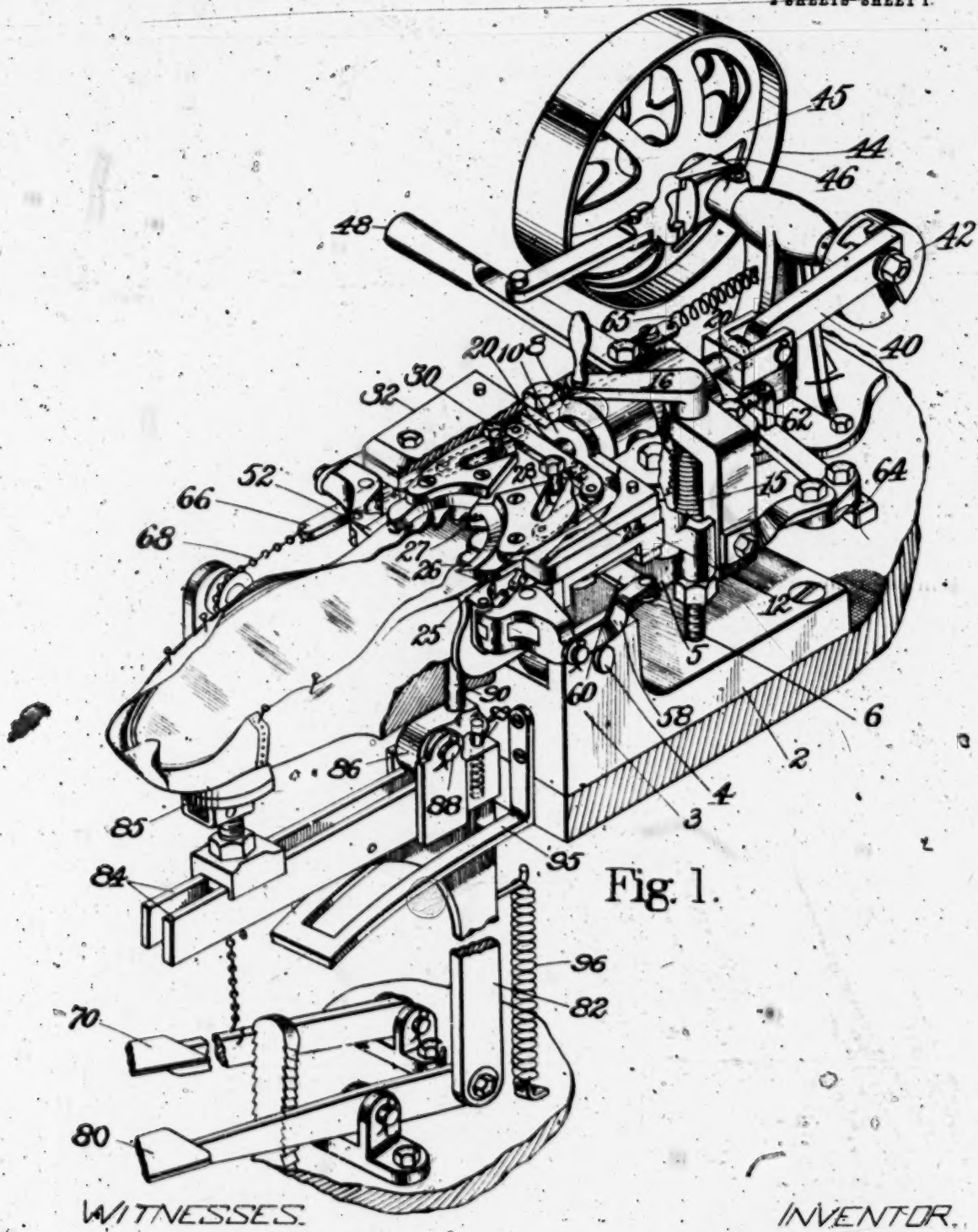


Fig. 1.

WITNESSES.

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END-LASTING MACHINE.

1,130,142. Specification of Letters Patent. Patented Mar. 2, 1915.

Application filed April 28, 1911. Serial No. 623,820.

To all whom it may concern:

Be it known that I, JAMES CAVANAGH, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in End-Lasting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to end lasting machines and is herein shown as embodied in a heel seat lasting machine of the "bed" or wiper type.

An object of this invention is to produce a machine by which end lasting can be performed more expeditiously and with less labor than heretofore.

An important feature of this invention consists in the combination with means for holding a shoe, of end embracing wipers and automatic power driven operating mechanism connected with the wipers for causing them to work the upper material into lasted position. The automatic operating mechanism may be arranged to cause the wipers to advance repeatedly over the shoe bottom. Preferably, in connection with the automatically operated wipers, means is provided for moving the shoe relatively to the wipers. The shoe moving means may be arranged to lift the shoe into a higher plane with relation to the wipers after they have initially broken down the upper materials. This enables the power driven wipers to iron down or compress the overwiped portion of the upper materials firmly upon the insole and give to the lasted portion of the shoe the detail of form or contour and the permanency of shape which is desired in a well lasted shoe.

In accordance with a further feature of this invention, novel means is provided for clamping and maintaining the upper materials firmly against the side faces of the shoe end while they are being lasted down upon the insole by the power driven wipers. This feature of the invention is embodied in improved mechanism for closing and holding the heel embracing band whereby very secure clamping of the upper is obtained with automatic adjustment of the band end closing pressure for right and left lasts that have very different shapes. Preferably the band closing mechanism is operated by a treadle and advantageously this treadle and the one by which the shoe is uplifted are located adjacent to one another in position to be engaged by different portions of the same foot of the operator whereby he can with ease variably control the band closing and the shoe uplifting pressure.

The several features of the invention, including certain details of construction and combinations of parts, will appear from the following description of the illustrated embodiment of the invention and will be pointed out in the claims.

Figure 1 is a perspective view of the machine; Fig. 2 is a plan view; Figs. 3 and 4 are sectional views illustrating the operation of the lasting plates upon the stock.

The machine comprises a base 2 which may be fastened to a bench or table or may have a pedestal supporting it from the floor. This base has at its front end upstanding ears 3 between which there is pivoted at 4 the machine head 5 which carries the lasting devices. This head is adjustably supported in the rear of the pivot 4 by the screw rod 6. This mounting permits the longitudinal inclination of the lasting plates to be varied by adjustment above the pivot rod 4. The head is formed with a longitudinal bearing at 8 for the rearwardly extending cylindrical stem portion 10 of a plate 12 upon which the heel lasting device are carried. The bearing 8 is formed to expose a worm toothed portion of the stem with which the screw rod 15 engages to effect transverse adjustment of the lasting devices about the axis of the stem 10. The crank 16 provides convenient means for turning the screw rod.

The stem 10 has a sliding bearing for a rod 20 having a cross-bar 22 which is connected by the links 24 with the wiper carriers 25 to which the wipers or lasting plates 26 having formed edges extending toward the shank of the shoe are removably attached. The wiper carriers have cam slots 28 in which stand rollers on the fixed studs 30 that connect the plate 12 with a cover plate 32. The outer edges of the wiper carriers are curved to engage walls of the recess in the plate 12 in which the wiper carriers are inclosed by the cover plate. These walls and the cam slots 28 effect and

direct inward closing movement of the wipers as they are advanced by their link connection with the operating rod 20. The operating rod is connected at its rear end by a link 40 eccentrically to a disk 42 secured to a driving shaft supported by a stand attached to the bench. The disk 42 has a transverse dovetailed groove which permits the rod 40 to be connected more or less eccentrically with it according to the amplitude of movement desired for the wipers. At its other end the driving shaft has a loose pulley 44 and a clutch 45 is adapted to be moved into driving engagement with the pulley by a wedge 46. This clutch is operated by a hand lever 48 to start and stop the machine.

A heel embracing band 52 is fastened to a chain which, at the rear, see Fig. 2, has a stud projecting into a recess in the head 5 where it is secured by a binding screw 54. At its front ends the band is supported by chain arms 55 having forwardly directed inner ends and which are fulcrumed on slide bars 56. The chain arms or levers are connected at their outer ends by links 58 with a pivoted cross-bar 60 on the end of the band closing rod 62. This rod is fastened at its rear end to a lever 64, see Fig. 1, fulcrumed at its right hand end and connected at its left hand end by a spring 65 with the stationary stand in which the driving shaft has its bearing. This spring pulls the operating rod 62 backwardly to open the band. Movement in the reverse direction for closing the band is effected by a slide rod 66, Fig. 1, which extends from the left hand end of the lever 64 to a chain 68 that runs over an idler to a treadle 70.

The slide bars 56, upon which the chain arms 55 are fulcrumed, are guided for endwise movement in the head 5 and each slide bar has on its outer edge, see Fig. 2, a wedge face or incline 75 which is held yieldingly by a spring plunger 76 against a stationary bearing face 78. This construction and arrangement provides that as forward movement of the links 58 is effected to close the band the slide bars will be forced forwardly and as they advance they will be wedged inwardly to shut the end portions of the band firmly against the sides of the last. The band is thus caused to clamp the upper materials, including the usual heel stiffener, firmly about the heel portion of the last and the band is so formed, as appears in Figs. 3 and 4, that hard pressure of the upper materials against the last is secured at the upper edge of the last over which they are to be bent by the wipers or lasting plates. A final hard band closing pressure may be obtained by adjustably limiting the forward movement of the slide bars, as by stop pins 79, and causing the last portion of the movement of the links 58 to be expended in turning the outer ends of levers 55 forwardly and their inner, forwardly projecting ends inwardly. The levers thus act as toggles to compress the end portions of the band against the sides of the shoe near the front ends of the heel stiffener.

A support for the shoe comprises an upright bar 82 carried by a treadle lever 80 and having upon its upper end rails 84 that support a toe rest 85 and a heel rest 86 toward and from which the toe rest can be adjusted for different lengths of shoes. The heel rest carries a last pin 90 and has movement about a pivot 88 by means of a spring pressed plunger 89 to tip the toe end of the shoe firmly down upon the toe rest for holding the shoe in place on the support. A guide bracket 95 embraces the bar 82 and confines the shoe support against lateral movement and limits forward movement of the support relatively to the lasting devices from which it is moved to apply and to remove a shoe as will be readily understood. A spring 96 draws down the shoe support when the treadle is released. The illustrated arrangement provides that the shoe support will stand normally depressed and tipped away from the machine as far as the bracket 95 permits.

In the use of the machine a shoe will be applied to the support and then the support pushed back into the heel band and raised by the treadle 80. One of the wiper plates has a height gage 27 to limit the upward movement of the shoe. The heel band is then closed by depressing the treadle 70. Each of these treadles may have an edge plate to engage a locking ratchet, if desired, but in practice I contemplate that the operator will depress the treadle 80 with the heel portion of his foot and then force down the treadle 70 with the toe portion of the same foot and will maintain his foot upon the treadles during the brief period which is required for the heel seat lasting operation by this machine. The shoe having been jacked and clamped as described, the operator will engage the clutch controlling lever 48 and start the machine, causing the wipers to advance and close over the heel from their normal open position, Fig. 3, to the position shown in Figs. 1 and 4. The driving mechanisms will rapidly reciprocate the wipers repeatedly over the heel seat and back again while the upward pressure of the shoe against the wipers is controlled by the operator through the treadle 80 and the band closing pressure is controlled by the treadle 70. The first advance of the wipers may take place with the plane of the shoe bottom slightly below the lower face of the wipers, as shown in Fig. 3, to break down the heel stiffener and other upper materials and then the shoe be raised, as indicated in Fig. 4, to

cause the wipers as they advance again to press the upper materials hard down upon the innersole. The height gage 27 prevents the shoe from being raised too high when the wipers are retracted. The overwiping operations of the wipers may be repeated as many times as, in the judgment of the operator, is required for the particular shoe in hand and the machine may then be stopped with the wipers partially backed off the shoe to uncover the tacking line and the upper may be tacked around the heel seat as usual by a hand tacker while the shoe remains in the machine. Alternatively the machine may be stopped with the wipers entirely backed off and the shoe, with the heel portion shaped to the sides and to the bottom face of the last, may be removed from the lasting machine and presented to a tacking machine for fastening the upper materials in lasted position.

Having explained the nature of this invention and described a preferred construction embodying the same, I claim as new and desire to secure by Letters Patent of the United States:—

1. An automatic end lasting machine having, in combination, end embracing wipers, power mechanism arranged for continuous operation at a predetermined rate of speed to impart repeated closing movements to said wipers, and shoe holding means constructed and arranged to present and hold the shoe continuously against lateral and longitudinal displacement in position to receive upon the same portion of the shoe materials repeated treatment by said wipers on successive movements thereof.

2. An automatic end lasting machine having, in combination, a support for a shoe, end embracing wipers for engaging and wiping over upon the innersole the upstanding margin of upper materials about the heel portion of the shoe at both sides simultaneously, power mechanism for operating said wipers repeatedly over the end and sides of the shoe heel, and means under control of the operator for starting and stopping said mechanism at will with the wipers in any position within their range of operative movement.

3. An automatic end lasting machine having, in combination, a support for a shoe, end embracing wipers, and power mechanism for operating said wipers repeatedly over the end and sides of the shoe heel, said machine comprising a connection between the wipers and the source of power permitting adjustment to vary the amplitude of reciprocation of the wipers.

4. An automatic heel seat lasting machine having, in combination, a support for the shoe, heel embracing wipers constructed to operate upon the upper materials at both sides of the heel seat simultaneously, power operating mechanism, connections from said mechanism to the wipers to reciprocate them repeatedly forth and back over the heel seat, shoe holding means constructed and arranged to present and hold the shoe continuously against lateral and longitudinal displacement in position to receive upon the same portion of the shoe materials repeated treatment by said wipers on successive movements thereof, manual means to start and stop the reciprocation of the wipers, and manual means adapted for adjustment while the machine is running for variably controlling the relation of the plane of the wipers and the plane of the heel seat.

5. An automatic heel seat lasting machine having, in combination, a support for the shoe, heel embracing wipers for engaging and wiping over simultaneously the upstanding portions of upper at both sides of the heel portion of the shoe, power operating mechanism, connections from said mechanism to the wipers to reciprocate them forth and back over the heel seat repeatedly, and manual means for relatively moving the shoe support and the wiper perpendicularly to the plane of action of the wipers while the wipers are reciprocating.

6. An automatic heel seat lasting machine having, in combination, a support for the shoe, heel embracing wipers for engaging and wiping over simultaneously the upstanding portions of upper at both sides of the heel portion of the shoe, power operating mechanism, connections from said mechanism to the wipers to reciprocate them forth and back over the heel seat repeatedly, and a treadle lever connected with the shoe support arranged to enable the operator to apply powerful upward pressure through the shoe support to force the shoe against the wipers.

7. An automatic heel seat laster having, in combination, a last support, heel embracing wipers for engaging and wiping over simultaneously the upstanding portions of upper at both sides of the heel portion of the shoe, power operating mechanism, manually controlled means for connecting said mechanism with the wipers to reciprocate them over the heel seat repeatedly, a last support, a treadle lever connected with the last support by which the shoe may be held up to the wipers and the upward pressure increased as the operation progresses, and a height gage preventing the shoe from being raised too high while the wipers are retracted.

8. An automatic heel seat laster having, in combination, a last support, heel embracing wipers for engaging and wiping over simultaneously the upstanding portions of upper at both sides of the heel portion of the shoe, power operating mechanism, connections from the mechanism to said wipers

to reciprocate the wipers forth and back over the heel seat, a last support, a spring to lower the last support, a treadle connected to the last support to force the shoe up against the wipers, and a height gage carried by the wipers and preventing the shoe from being raised by the treadle pressure above the lower face of the wipers while they are retracted.

9. An automatic heel seat lasting machine having, in combination, heel seat wipers, a base having at its front end upstanding ears, a head pivoted between said ears and adjustably supported in the rear thereof to vary the longitudinal inclination of the wipers, a plate having a cylindrical stem having bearing in said head, means for adjusting said plate about the axis of said stem to change the transverse inclination of the wipers, means carried by said plate for guiding and controlling the reciprocatory movement of said wipers over the heel seat, power mechanism adapted for continuous operation, manual means for starting and stopping the operation of said mechanism, and connections from said mechanism to the wipers, said connections being constructed to effect repeated reciprocations of the wipers without interfering with said adjustments.

10. An automatic heel seat lasting machine having, in combination, heel seat wipers, a base having at its front end upstanding ears, a head pivoted between said ears and adjustably supported in the rear thereof to vary the longitudinal inclination of the wipers, a plate having a cylindrical stem having bearing in said head, means for adjusting said plate about the axis of said stem to change the transverse inclination of the wipers, means carried by said plate for guiding and controlling the reciprocatory movement of said wipers over the heel seat, an operating rod arranged concentrically in said stem and connected at its front end with the wipers, a driving shaft, a disk on said shaft, a link eccentrically connected with said disk and connected with said rod, power mechanism for actuating the driving shaft, and means under control of the operator for connecting and disconnecting said power mechanism from the driving shaft.

11. An automatic heel seat lasting machine having, in combination, heel seat lasting wipers, power driven mechanism arranged for continuous operation to reciprocate said wipers and close them a plurality of times over the heel seat to break down the same portion of the upper materials and to lay them in lasted position on the insole, a heel embracing band to clamp the upper materials around the last at and adjacent to the edge over which said materials are broken down by the wipers, and means for actuating said band to effect such clamping of the work preparatory to starting the power mechanism for actuating the wipers, said band operating means being adapted for manual control during the continued operation of the power driven wipers.

12. An automatic heel seat lasting machine having, in combination, heel seat wipers having shaped edges extending over the heel seat from its rear end forwardly toward the shank, mechanism for actuating said wipers to break down the upper materials including the heel stiffener and to lay them in lasted position upon the insole, a heel embracing band formed to clamp the upper materials in advance of the operation of the wipers around the heel portion of a last adjacent to the edge over which the wipers bend the upper materials in breaking them down and laying them in lasted position, said band extending forwardly along the sides of the shoe toward the shank, levers having forwardly directed inner arms connected to the ends of the band, operating means acting forwardly upon the outer arms of the levers, slide bars upon which the levers are fulcrumed, guides for the slide bars, cooperating inclines formed on said slide bars and guides to displace said slide bars and thereby the levers and the band ends inwardly as the bars slide forwardly and manual means for opening and closing the band while the wiper operating means is running.

13. In an automatic heel seat lasting machine, an end embracing band, a chain encircling the band, chain arms having forwardly directed ends connected with the ends of the chain, slide bars on which said chain arms are fulcrumed, guideways in which the slide bars are movable endwise, coöperating relatively inclined faces formed on the slide bars and guides for wedging the chain arms inwardly as the slide bars advance, and operating means connected with the outer ends of the chain arms and acting therethrough to effect forward movement of the slide bars and inward pressure against the end portions of the band.

14. In an automatic heel seat lasting machine the combination with heel seat lasting wipers and operating mechanism for said wipers, of means for holding the shoe for the heel seat lasting operation, a heel embracing band to clamp the upper materials about the last in position to be overwiped by the wipers, a treadle and operating connections to the band for closing it about the last, and a last support and a treadle for raising the shoe against the wipers, said treadles being arranged in position to enable the operator to engage the shoe lifting treadle with the heel of the foot and the band closing treadle with the ball of the same foot, as and for the purpose described.

15. An end lasting machine having, in combination, end lasting wipers, means to actuate them, an end embracing band to hold the upper for the action of the wipers, and band closing means comprising levers having forwardly directed ends attached to the band, slide bars on which the levers are fulcrumed, actuators connected to the outer ends of the levers and stops to arrest the forwardly sliding movement of said bars and cause the levers to act as toggles for compressing the end portions of the band against the sides of the shoe.

16. In an automatic heel seat lasting machine, an end embracing band, a chain encircling the band, chain arms having forwardly directed ends connected with the ends of the chain, slide bars on which said chain arms are fulcrumed, and operating means including equalizing mechanism connected with the outer ends of the chain arms and acting therethrough to effect inward pressure against the end portions of the band.

17. An automatic end lasting machine having, in combination, end lasting wipers, guiding means for the wipers, power operating mechanism for advancing and closing the wipers a plurality of times over the same portion of the upper in lasting a single shoe, means for supporting the shoe continuously in position to receive upon the same portion of the upper repeated treatment by the wipers, and means under the control of the operator for changing the vertical position of the shoe with relation to the wipers without interrupting the reciprocation of the wipers, said manually controlled means being constructed to permit lowering of the shoe previous to the retraction of the wipers to relieve the drag of the wipers over the inwardly wiped stock.

18. An automatic end lasting machine having, in combination, end lasting wipers, means for guiding the wipers to close and advance over the shoe bottom and to open and retract therefrom, continuously running power operating mechanism with which the wipers are connected, and manually controlled shoe supporting and heel band clamping mechanism by which a shoe may be presented for the operation thereon of the wipers and withdrawn when the operation has been carried out to the satisfaction of the attendant.

19. An automatic end lasting machine having, in combination, end lasting wipers, means for guiding the wipers to close and advance over the shoe bottom and to open and retract therefrom, continuously running power operating mechanism with which the wipers are connected, an end embracing band, means connected with the end portions of the band to cause it to clamp the upper materials about the end of the last and hold them for the operation of the wipers over the shoe bottom, and manually controlled shoe supporting mechanism by which the shoe may be presented for the operation thereon of the band and the wipers and withdrawn when the operation has been carried out to the satisfaction of the attendant.

20. An automatic end lasting machine having, in combination, end embracing wipers, power operating means connected with said wipers and adapted for continuous operation to advance and close the wipers repeatedly on a shoe end, and a shoe support movably mounted in operative relation to said wipers and adapted to receive a shoe in a position away from the wipers and to carry the shoe into the field of operation of the wipers and hold it in said field continuously during the repeated operations of the wipers.

21. An automatic end lasting machine having, in combination, end embracing wipers, power operating means connected with said wipers and adapted for continuous operation to advance and close the wipers repeatedly on a shoe end, a shoe support movably mounted in operative relation to said wipers and adapted to receive a shoe in a position away from the wipers and to carry the shoe into the field of operation of the wipers and hold it in said field continuously during the repeated operations of the wipers, and manually controlled means for manipulating the support during the continuous operation of the wipers to vary and determine the action of the wipers on the shoe during their successive operative movements.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES CAVANAGH

Witnesses:
JOHN B. HADAWAY,
ARTHUR L. RUSSELL.

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E. A. STIGGINS.

WORK SUPPORT.

APPLICATION FILED APR. 22, 1911.

1,132,630. Patented Mar. 23, 1915.

3 SHEETS-SHEET 1.

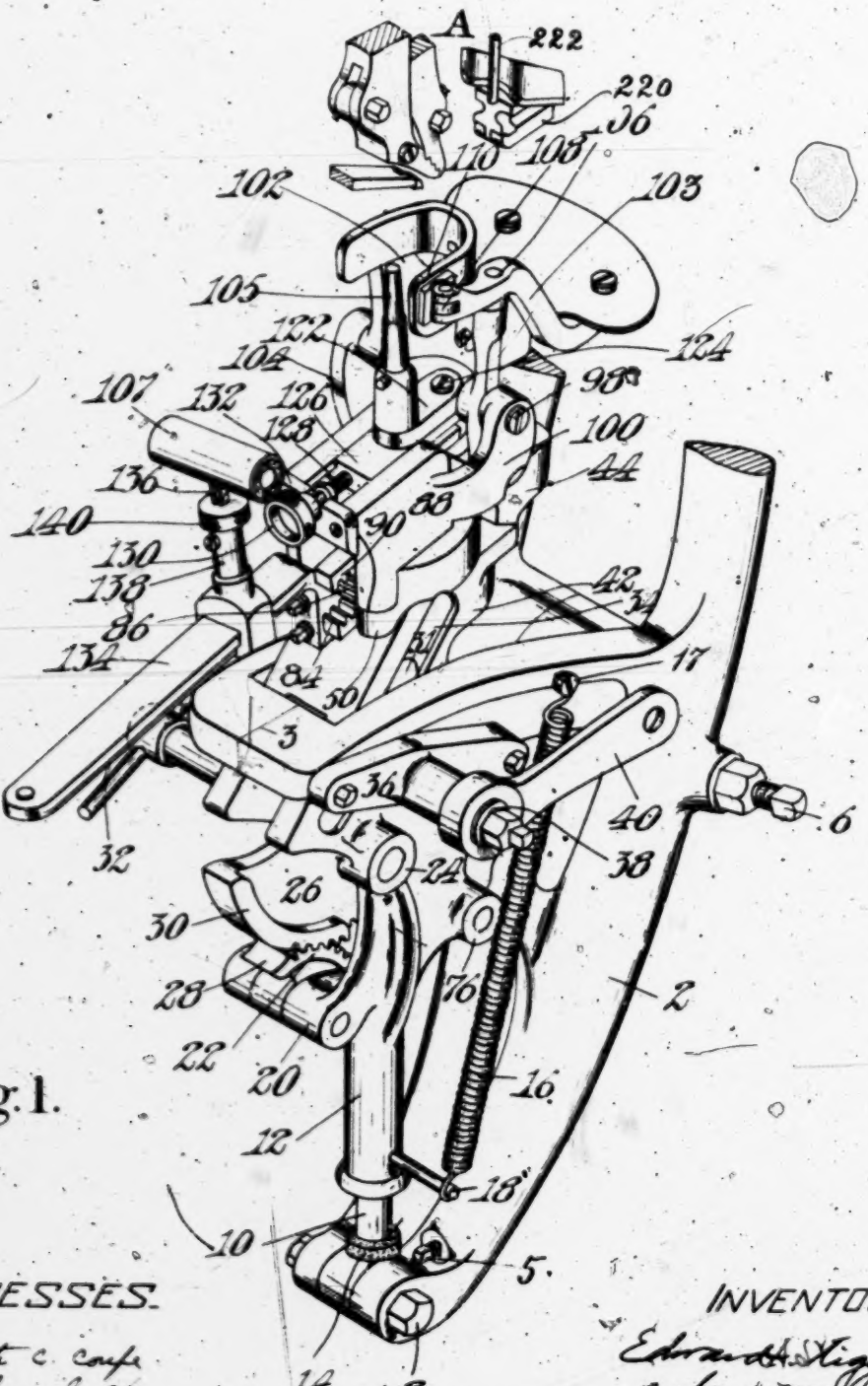


Fig. 1.

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Nelson R. Howard

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3 SHEETS—SHEET 2.

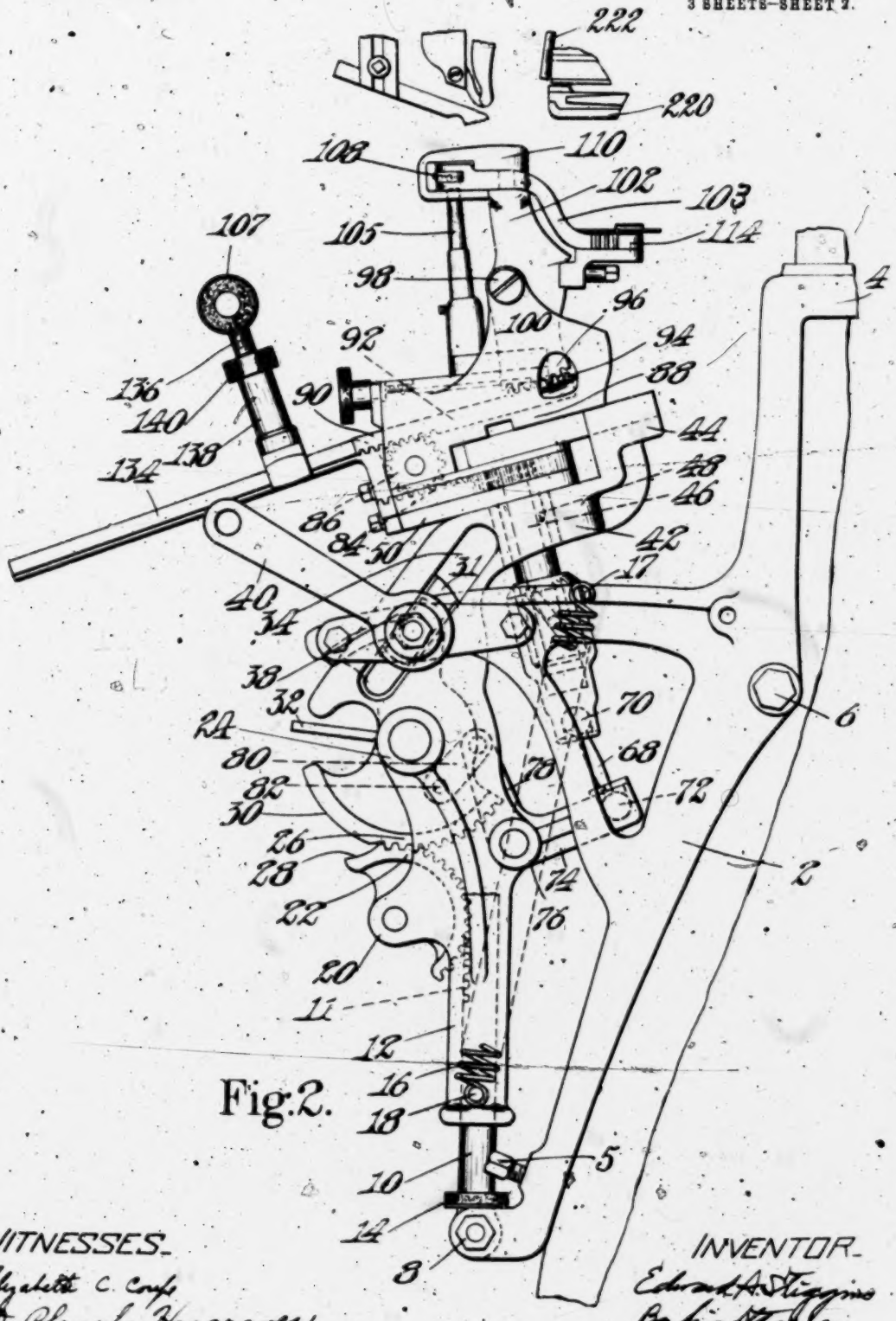


Fig. 2.

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APPLICATION FILED APR. 22, 1911.

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3 SHEETS-SHEET 3.

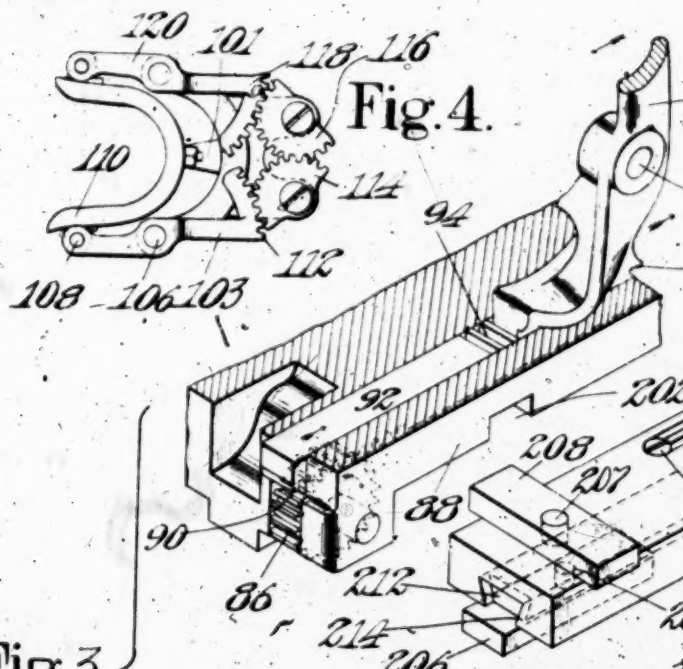
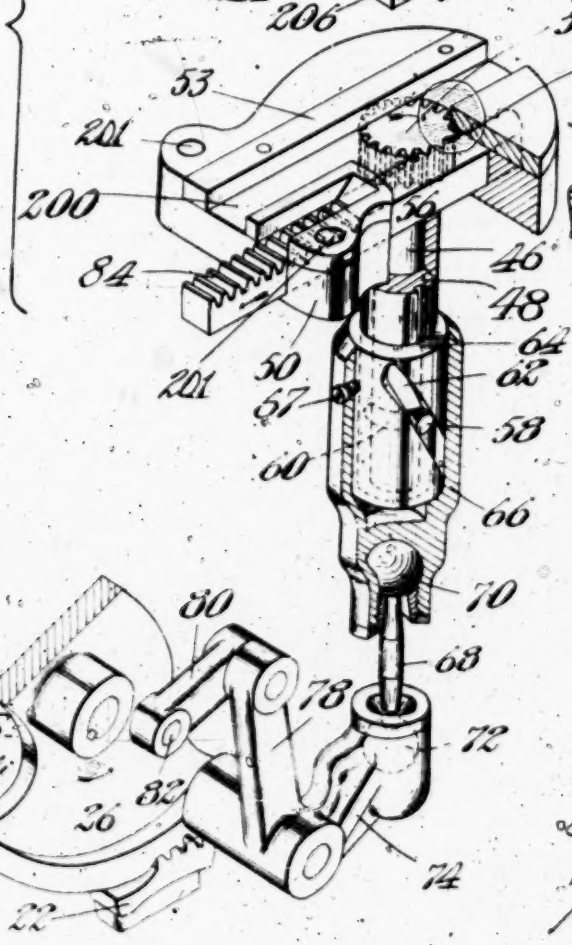


Fig. 4.

Fig. 3.



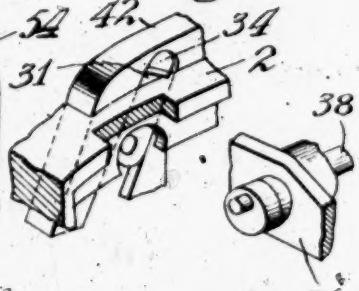


Fig. 6.

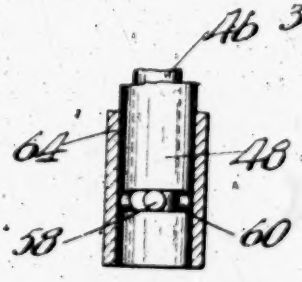


Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWARD A. STIGGINS, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WORK-SUPPORT.

1,132,630. Specification of Letters Patent. Patented Mar. 23, 1915.

Application filed April 22, 1911. Serial No. 622,756.

To all Whom it may concern:

Be it known that I, EDWARD A. STIGGINS, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Work-Supports, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to work supports for shoe machines and is herein shown as embodied in a work support or a jack designed particularly with reference to holding a last and the parts of a shoe in position for the performance thereon of the operation of heel seat lasting by a machine of the hand method type. It is to be understood, however, that mechanism involving the invention is by no means limited to such use, but may be applied to jacks for holding shoes in proper position to be operated upon by various machines for treating the heel or the heel-seat portion of the shoe, such, for example, as slugging machines, nailing machines, trimming machines, breasting machines, and the like.

In lasting the heel-seats of shoes upon machines of the hand method type it is the present general practice for the operator to hold the shoe in his hands with its bottom against a downwardly projecting rest and with the side of the heel portion pressed laterally against a rest which is wide enough to form a firm abutment. The work being so held, the machine acts to wipe in the upper material, which includes the flange of a molded or unmolded heel stiffener, and to drive a tack through it and the insole, clenching the same upon the nail plate of the last. When this cycle of operations is completed, the operator slides the shoe along the edge rest at the same time rotating it an amount corresponding to the curvature of the portion being acted upon, and the operation of wiping in and tacking is repeated by the machine. In this procedure, the spacing of the tacks from the edge of the last is determined by the position of the edge rest relatively to the driver, while the spacing between the tacks is determined entirely by the judgment and skill of the operator.

An object of the present invention is to hold a shoe securely and present the same in proper relation to a wiping and tacking mechanism, so that the tacks will be properly located about the heel-seat independently of the usual edge rest or of any great skill or attention on the part of the operator, the operation required being merely the placing of the shoe upon the jack spindle, the raising of it into position, and the swinging of the shoe slowly about the jack spindle through a portion of a revolution, the mechanism provided acting to locate the heel-seat properly beneath the wiping and driving mechanism and to so guide its movement relatively thereto that the tacks will be driven along a predetermined path which, in the form of the invention shown and described, is substantially in the form of a portion of an ellipse and corresponds very closely to the outline of the heel or heel-seat of an ordinary shoe. The operator has only to rotate the shoe by slight intermittent movements about the last pin after each cycle of operations of the machine in order to space the tacks properly from each other, this movement requiring no particular skill or attention on the part of the operator.

An important feature of the invention relates to the means employed for securing a movement of the shoe support such that a relatively stationary operating mechanism or tool will trace a predetermined path relatively to the heel or heel-seat of a shoe carried by said support. In the construction shown and later to be described in detail, this path is elliptical in form and the movement of the shoe support is effected by mounting the shoe support for movement upon a relatively stationary carrier and providing, between the support and the carrier, mechanism such that when the support is given a rotative movement relatively to the carrier a point on the heel or heel-seat of the shoe on the support will trace an elliptical path relatively to a stationary point. The mechanism provided for this purpose involves broadly the principle of the well-known trammel for drawing

ellipses, slots at right angles to each other being formed in the parts of the carrier and a member corresponding to the pencil-carrying arm of the channel being provided with pins at one end engaging the slots through sliding blocks and having its other end fixed to a portion of the carrier which is stationary relatively to the shoe support. The fixed end is, however, arranged for adjustment for changing the size of the ellipse generated by a point on the heel-seat and means is provided for adjusting the position of the pins relatively to each other in order that the ellipticity of the movement given to the shoe may be varied. When the pins are in line with each other, the movement will be circular, and as they are displaced more and more out of line, the path of movement becomes elliptical with an increasing degree of eccentricity.

Another feature of the present invention is embodied in the means for raising the jack carrier upwardly and at the same time forcing it backwardly to position the shoe properly beneath the operating devices and in the means for locking the carrier and jack in place when this position is reached. For effecting the vertical movement, a segment gear journaled on the carrier is provided which meshes with a rack pivoted at its lower end to a part stationary on the base of the machine, and a second segment gear also journaled on the carrier meshes with the segment gear first mentioned and is provided with a hand lever for rotating it to cause the first mentioned segment gear to climb the rack and elevate the carrier. The rearward, or oscillating, movement of the jack carrier which takes place simultaneously with its upward movement is effected by inclined guiding slots formed in the carrier and engaging projections on the relatively stationary base. For effecting the locking of the jack in its raised position, the segments are provided with smooth or untoothed portions, one concave and the other convex, which interengage as soon as the jack is raised to the proper height and lock the same in raised position until the hand lever is again operated.

Another important feature of the invention involves the mechanism for closing the shoe clasp or heel band upon the shoe and for effecting this operation simultaneously with the movement of the jack into raised position. From the toothed segment above referred to, which is provided with a hand lever, motion is communicated by suitable mechanism to the heel band to force the same forwardly against the back of the heel portion of the shoe. As pressure is applied by the heel band to the back of the shoe, the forward portion of the heel band, which is connected through the mechanism referred to with the hand operated segment, tends to move inward against the shoe and this inward motion is communicated through suitable mechanism to the end of the heel band at the opposite side of the shoe so that both sides are pressed in against the heel portion simultaneously.

Another feature of the invention is embodied in means for giving the jack a slight movement or sensitive adjustment toward and from the machine independently of the movements described. This consists of a shaft mounted in a stationary portion of the jack base and carrying an eccentrically mounted pin arranged to communicate its movement to the jack carrier so that rotation of the shaft will move the jack slightly in and out to position the heel-seat accurately with respect to the tacking mechanism.

As another feature of the invention, the last pin is mounted for movement laterally of the longitudinal axis of the last carried thereby so as to permit the shoe clasp or heel band, as it closes, to center the heel-seat of the last relatively to the heel band and to the mechanism for operating upon the heel-seat. As disclosed, this result is effected by mounting the last pin upon a block which is pivoted to the jack base at a point to the rear of the last pin.

Another feature of my invention is involved in the manner of mounting the toe rest for adjustment relatively to the last pin for effecting a vertical movement of the toe rest simultaneously with its adjustment longitudinally of its support. This result is effected by arranging the member along which the support of the toe rest slides at an obtuse angle to the axis of the last pin, so that as the toe rest is moved nearer to the last pin to accommodate smaller shoes it will, at the same time, be raised vertically to compensate for the diminished thickness of the toe portion of the smaller shoe.

The foregoing and other features of the invention will appear more fully from the following description and drawings, in which—

Figure 1 is a perspective view of an illustrative embodiment of the invention and the associated parts of a lasting machine of the hand method type, a full description and illustration of which may be found in United States Letters Patent No. 584,744: Fig. 2 is a side elevation of the same: Fig. 3 is a detail, with the parts displaced vertically of a portion of the means for tightening the heel band about the heel and producing elliptical movement of the heel-seat: Fig. 4 is a plan view of the heel band and its closing mechanism; Fig. 5 is a detail of a portion of Fig. 3. Fig. 6 is a fragmentary detail of the fine adjustment mechanism.

Referring to Fig. 1, the character 2 indicates a base which, for convenience, is made

in separate parts joined at 3 and is detachably connected to the pedestal of the lasting machine by a collar 4 (Fig. 2) and clamping screws 6. When the clamping screws 6 are loosened, the lower end of the base 2 may be adjusted toward and from the pedestal by means of a screw 5 and the screws 6 then set up to hold the base in fixed position. Pivoted to the bottom of the base 2 by a bolt 8 is a rod 10 having a rack 11, Fig. 2, formed on its front side. Upon this rod slides a hollow standard 12 which forms the lower part of what may be termed the jack carrier, as distinguished from the jack proper which supports the shoe and is turned with it. On the rod below the standard is a washer 14 of suitable material to act as a buffer and the weight of the jack is partially counterbalanced by a spring 16 fast at one end to a screw 17 on the base 2 and at the other end to a pin 18 secured to the standard 12.

Journaled in bosses 20 extending forwardly from the standard 12 is a toothed segment 22 which meshes with the rack 11 on the rod 10. On the jack carrier above the bosses 20 are bosses 24 in which is journaled a toothed segment 26 which meshes with the segment 22. The segment 26 is provided with an untoothed or smooth face 30 which, after the toothed portion has ceased to engage with the toothed portion of the segment 22, interengages with a smooth concave face 28 on the segment 22 and automatically locks it against further rotation. The journal of the segment 26 is extended to the left and provided with an operating lever 32. A portion of the jack carrier integral with the boss 24 extends upwardly at an angle to the vertical and is provided with an oblique guiding slot 34. A plate 36 is bolted to the base and carries a stud shaft 33 having at one end a handle 40 and at the other a pin eccentrically attached thereto and engaging a slide 31 mounted in the slot 34 of the jack carrier.

The operation of the device as thus far described is as follows: Movement of the hand lever 32 turns the segment 26 and hence the segment 22 which, being in engagement with the rack 11, causes the segment 22 to climb the rack and raise the jack carrier upon the rod 10, this movement being assisted by the spring 16 until the smooth faces 28 and 30 engage and the jack carrier is automatically locked in raised position. Meantime the portion of the jack carrier having the oblique guiding slot 34 moves over the slide 31 and the jack carrier as a whole is oscillated about the pivot 8 and forced backwardly toward the lasting machine, this movement being due to the inclination of the slot. A finer adjustment of the jack toward and from the machine (see Figs. 1 and 6) may be effected by manipulation of the handle 40 which rotates a shaft 38 and, through an eccentric pin engaging the slide 31, gives the jack carrier and jack a slight oscillatory movement about the pivot 8 to furnish a fine adjustment for the work backward and forward under the lasting mechanism.

Above the portion of the jack carrier in which the inclined slot 34 is formed is a jack seat portion 42 having at its rear end an upstanding portion 44. Upon the portion 42 is seated the lower plate 50 of the jack proper. A shaft 46, Fig. 3, passes through a sleeve 48 stationary with the plate 50 and carries a pinion 52 fixed upon it. For assembling the pinion 52 in its socket in the plate 50 the groove 200 is made larger than is necessary, and after the pinion is in place is partially filled by a strip 53 secured therein which serves to hold the pinion in assembled position. The pinion 52 meshes with the rack 54 on a bar 56 and is actuated by rotation of the shaft 46 as follows: A pin 58 fixed in the shaft 46 projects through a horizontal slot 60 in the sleeve 48, Fig. 5, and engages the inclined slot 62 in the sleeve 64, Fig. 3. The sleeve 64 is splined on the sleeve 48 which is fast on the plate 50. By this means the sleeve 64 is prevented from rotating and when given longitudinal movement the action of the inclined slot upon the pin 58 is to rotate the shaft 46 and pinion 52. An outer sleeve 66 is secured by a screw 67 upon the sleeve 64 and is connected by a bar 68 and ball and socket joints 70 and 72 with one arm 74 of a bell-crank lever which is fulcrumed in bosses 76 on the standard 12. The other arm 78 of the bell-crank is connected by a link 80 with a wrist pin 82 on the segment 26. From an inspection of Fig. 3 it will now be clear that upon rotation of the segment 26 in a counter-clockwise direction, as indicated by the arrow, to raise and lock the jack the bell crank will be operated to pull down on the connecting bar 68 and the sleeves 66 and 64 whereby the pinion 52 is rotated in a clockwise direction and the rock bar 56 is moved to the left or away from the lasting machine.

An upwardly facing toothed portion 84 of the rack bar 56 engages a pinion 86 journaled in a member 88 and the pinion in turn engages a downwardly facing toothed portion 90 of a rack bar 92. The opposite end of the bar 92 has an upwardly facing toothed portion 94 which engages a toothed segment 96 on one arm of a lever 97 fulcrumed at 98 on a bracket 100, Fig. 1, of the member 88. The upper portion 102 of the lever is substantially semi-cylindrical and extends around to a bracket 104, corresponding to the bracket 100, in which it has a fulcrum corresponding to that at 98. A shoe clasp or heel band 110 is attached at the mid-

dle of its bent portion by a flexible connection 101, Fig. 4, to the semi-cylindrical portion 102 of the lever 97 and is, by movement of the rack bars, pinions and lever described, pressed against the heel of a shoe, the heel portion of the last of which is supported upon a spindle 105 and the toe portion upon a vertically and horizontally adjustable toe rest 107, Fig. 1. The forcing of the heel band closely against the side of the heel portion of the shoe is accomplished by further movement of the lever 97 in the same direction. A lever 103 is pivoted to the lever 97 at 106 and to one end of the heel band at 108. It will now be apparent that, as the rear portion of the heel band is held practically stationary by its contact with the shoe, movement of the lever 97 forward will tend to rock the lever 103 on its pivot 106 and force the end 110, Fig. 1, of the heel band toward the shoe. This motion should, of course, be communicated to the corresponding end of the heel band on the other side of the shoe. This is accomplished by the mechanism shown in Fig. 4. The lever 103 carries a segment rack 112 which meshes with a segment pinion 114 engaging a similar segment pinion 116. The segment pinion 116 in turn engages a toothed segment 118 on a lever 120 corresponding to the lever 103. In this way it will be apparent that the two ends of the heel band are made to move simultaneously inward to the same extent and thereby closely embrace the heel portion of the shoe.

The means for giving a point on the heel seat of the jacked shoe an elliptical movement comprises the slot 200, Fig. 3, in the base 50 and a slot 202 at right angles to it. These slots are slidingly engaged respectively by blocks 206, 208, pivoted on opposite sides of a block 210 by pins 205, 207 respectively. The end of the block 210 is seated in the upstanding portion 44 of the jack carrier 42, and is provided with slots 217 having about their upper peripheries shoulders 219 which engage the heads of screws 216 for holding the block 210 against upward displacement and permitting longitudinal adjustment of the block and the jack relatively to the support 42. In order that the ellipticity of the movement of the heel may be varied, the block 206 instead of being pivoted directly to the block 210 is pivoted to a slide 212 adjustable longitudinally in a dove-tailed slot 214 and normally held in place by a screw 215. The plates 50 and 88 are rigidly secured together by screws passing through holes 201 in the plate 50 into threaded holes (not shown) in the plate 88, the plate 210 having free movement with respect to the plates 50 and 88 except as restricted by the blocks 206, 208 in the slots 200 and 202, respectively.

The elliptical movement produced by the mechanism just described will perhaps be best understood if it is considered first what will take place if the block 210 is free to move while the plates 50 and 88 are held stationary. Suppose a point is taken on the slotted end of the plate 210 and the plate is swung around over a stationary plane, all the other jack parts being stationary, it will be apparent that the action of the pins 205, 207, the blocks 206, 208 and the slots 200 and 202 at right angles to each other will be to constrain the point to trace an ellipse upon the stationary plane, the action being similar to that of the ordinary ellipsograph or trammel for drawing ellipses. If now we hold the plate 210 stationary, as it is in practice, being clamped by screws 216 which pass through slots 217 into the upstanding portion 44, and move the plates 50 and 88 with the jack thereon it will be seen that a stationary point, for instance, the driver of the lasting machine, will trace an ellipse upon a plane supported on the jack and swung around with it, or upon the heel-seat of a shoe held by the last pin 105 and the heel band 110.

The shoe is supported upon the jack by a spindle 105, Fig. 1, and a toe rest 107, the spindle is attached to a block 122 which is pivoted by a screw 124 to a slide 126 in which is threaded a screw 128 having a thumb nut 130 and journaled in a plate 132. By this means the shoe may be adjusted to and from the heel band and is permitted by movement of the block 122 about its pivot 124 to center itself therein. The toe rest slides upon a member 134 which is bolted to the jack member 50 and serves as a lever for turning the shoe beneath the heel-seat lasting mechanism indicated at A, Fig. 1. The toe rest is vertically adjustable by means of a screw 136 splined to a stem 138 and threaded through a thumb nut 140.

It will be observed from Fig. 2 that the member 134 upon which the toe rest is mounted for sliding adjustment is inclined downwardly and makes an obtuse angle with the last pin so that as the toe rest is moved nearer the last pin to accommodate a smaller shoe it will be raised, due to the inclination of the member 134, and is thus automatically adjusted vertically to compensate for the diminished thickness of the toe portion of the smaller shoe. Accordingly, only the finer adjustments have to be taken care of by the thumb nut 140 and screw 136.

The operation of the device as a whole may now be briefly reviewed. The operator places the last carrying the assembled insole and upper upon the spindle 105 and rests the toe of the shoe upon the rest 107. He then depresses the lever 32 which first, through the rack 11 and segments 22 and 26, raises the jack and shoe toward the lasting devices at A, Fig. 1. At the same time the

inclined slot 34 carries the shoe back under the lasting devices. After reaching the limit of vertical and lateral movement due to the instrumentalities noted the smooth portions 28 and 30 of the segments interengage and the jack is locked in position. Should some slight further movement be necessary, due, for instance, to the varying characteristics of individual shoes, the lever 40 may be manipulated to give a slight to-and-fro movement to the jack.

During the upward movement of the jack and after the segment 22 becomes locked, motion is transmitted from the segment 26 through the link 80, bell crank 74, bar 68 to the sleeves 66, 64 to move them downwardly and by means of the pin 58 and slot 62 this motion is transmitted into rotary motion of the shaft 46 and pinion 52. Thence through rack 84, pinion 86 and rack 92 the lever 97 is oscillated and the heel band clamped about the heel as described. The shoe is now firmly held in proper position beneath the lasting device. The shoe is first swung around (say to the left) to bring one end of the heel band adjacent to the lasting mechanism and the lasting machine started. The tack block 220 wipes a portion of the upper in over the heel-seat and the driver 222 drives a tack through it to tack it down. Between this cycle of operations of the lasting machine and the next, while the tack block is withdrawn, the shoe is swung slightly to the right to present a new portion of the upper to the wiping action of the tack block and to enable the tacking mechanism to drive another tack somewhat displaced from the first along the periphery of the heel-seat or heel. As the operation proceeds, the tacks are driven along an elliptical path, (due to the elliptical movement described). The shape of the heel-seat of a shoe approximates so closely to a portion of an ellipse that by giving the heel-seat a truly elliptical motion beneath the tack driver the tacks are arranged at a substantially constant distance from the edge of the heel about the heel-seat. By this device, a comparatively unskilled workman may accurately perform the operation of heel-seat lasting, it being only necessary for him to set the shoe upon the jack, operate the lever 32 (and possibly lever 40), start the machine and swing the shoe around with what is substantially a continuous motion, interrupted only by the brief dwells of the tack block and driving mechanism upon the shoe.

Having described one mechanical embodiment of my inventive idea and explained the mode of operating the same, without limiting myself to any specific mechanical means which may be variously modified without departing from my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A jack for heel-seat lasting comprising shoe supporting devices, a carrier therefor, manually operable means for raising the carrier, means for compelling backward movement of the shoe supporting devices during the upward movement of the carrier, and means for locking the jack in operative position by the same movement.

2. A jack for heel-seat lasting comprising shoe supporting devices, a carrier therefor, operating means comprising interengaging segment racks for raising the supporting devices, and means comprising oblique pin and slot guiding means to compel rearward movement of the shoe as it is lifted.

3. A jack for heel-seat lasting comprising shoe supporting devices, a carrier therefor, operating means comprising a rack, a hand lever, connections operated by the hand lever to cause the carrier to climb the rack, a pivotal connection between the shoe supporting devices and the carrier, and means to rock the devices and the shoe thereon automatically toward the machine as it is raised.

4. A jack for heel-seat lasting comprising shoe supporting devices, a carrier therefor, operating means for raising the carrier, and means for compelling backward movement of the shoe supporting devices during the upward movement of said jack having means formed with the raising means for automatically locking the supporting devices in their raised and posterior position.

5. A jack for heel-seat lasting comprising shoe supporting devices, a carrier therefor, and operating means comprising interengaging segment racks for raising the supporting devices, said segment racks having smooth portions at the ends of the toothed portions to effect locking of the supporting devices in upraised position.

6. A jack for heel-seat lasting comprising shoe supporting devices, a carrier therefor, operating means comprising interengaging segment racks for raising the supporting devices, said segment racks having smooth portions at the ends of the toothed portions to effect locking of the supporting devices in upraised position, and means for making final adjustment of the shoe after such locking.

7. A heel-seat lasting jack comprising shoe supporting means, a carrier therefor, a base with relation to which the carrier is movable to transfer the supporting means from shoe receiving position to heel-seat lasting position, and unitary mechanism which can be operated to effect such movement and will automatically lock the shoe against displacement when the lasting position is reached.

8. A heel-seat lasting jack comprising

shoe supporting means, a carrier therefor, a base with relation to which the carrier is movable to transfer the supporting means to shoe receiving and heel-seat lasting position, and segmental racks for effecting said movement, said racks having interengaging smooth portions coöperating at the end of the movement to lock the carrier.

9. A heel-seat lasting jack comprising shoe supporting means, a carrier therefor, a base with relation to which the carrier is movable to transfer the supporting means to shoe receiving and heel-seat lasting position, and coöperating segmental racks and oblique guiding slots to effect and direct said movement, the racks having smooth locking portions making engagement at the end of the movement to lock the shoe in position to be operated upon.

10. Apparatus of the class described having, in combination, hand lever operated means for guiding and directing movement of a shoe from position of presentation to position to be worked upon, and means also operated by said lever for effecting the locking of said means with the shoe in the latter position.

11. Apparatus of the class described having, in combination, means for guiding and directing movement of a shoe from position of presentation to position to be worked upon, and operating mechanism therefor comprising coöperating toothed segmental racks having portions other than the teeth which interengage to lock the said means automatically with the shoe in the latter position.

12. A jack having, in combination, shoe holding devices, means for raising the jack, and means actuated by the raising means for automatically actuating the holding devices relatively to the shoe therein, said holding devices being mounted for movement in the plane of the heel seat.

13. A jack having, in combination, shoe holding devices including a heel clasp, and means for effecting vertical bodily movement of the holding devices and the shoe together, said means operating also for closing the clasp about the shoe and being mounted for rotation about a vertical axis.

14. A jack having, in combination, shoe holding devices, a carrier therefor, means for effecting movement of the carrier to transfer the shoe from position of presentation to position for operation upon the shoe, connections for actuating the shoe holding devices relatively to the shoe to clamp the shoe by the said means, and means permitting rotation of the shoe in a horizontal plane.

15. A jack having, in combination, shoe holding devices, including a shoe clasp, a carrier for said devices, an actuator, connections therefrom to move the carrier and the shoe thereon bodily and for closing the clasp, and means whereby the clamped shoe may be swung about a vertical axis.

16. A jack having, in combination, shoe holding devices, a carrier, means for actuating the carrier to move the shoe from a position of presentation to a position for the heel-seat to be lasted and to lock the carrier against displacement from the latter position, and guiding means insuring movement of the shoe in an elliptical path when the shoe is turned to present successive portions progressively for the heel-seat lasting operation.

17. A jack having in combination, supporting means, a heel post having a normally fixed position with respect to the direction of the length of the shoe and relatively to said supporting means, and a toe rest mounted for adjustment lengthwise of the jack and independently of the heel post for long and short shoes, the direction of such adjustment being at an obtuse angle to the longitudinal axis of the heel post.

18. A jack having, in combination, a heel post, a carrier therefor upon which the post is adjustable in the direction of the longitudinal axis of the shoe, a toe rest, and a support for the rest that is connected with said carrier and extends in a direction downwardly and outwardly to the direction of the post and along which the toe rest is adjustable independently of the heel post for short and long shoes.

19. A jack having, in combination, a heel post pivotally mounted for lateral movement about an axis displaced longitudinally of the jack from the post, and a heel clamp mounted in fixed lateral position and symmetrically actuated and with relation to which the shoe is positioned by the movable heel post.

20. In a device of the class described, means for movably supporting a last, means for clamping the heel portion of a shoe upon the last, and means acting as the last is moved to so constrain said movement that the point of operation of the tool will be transferred about the heel seat of the last in an elliptical path.

21. In a device of the class described, a last spindle, a toe rest, a heel clamp, said parts being mounted for rotation about an axis lying substantially in the direction of the last spindle, and means acting when said parts are rotated to cause movement of the last spindle in an elliptical path.

22. In a device of the class described, a rotatably mounted shoe jack, and means for effecting movement of the axis of said jack in an elliptical path as the jack is rotated.

23. In a device of the class described, a shoe jack, and means adapted to be manu-

ally operated for raising said jack toward the operating mechanism and simultaneously moving the same backwardly under the operating mechanism, said means acting subsequently to lock said jack in position.

24. A device of the class described, comprising a last spindle, a heel band, manually operable means to raise said parts into operative relation to a shoe machine and to close said heel band upon a shoe, and means becoming effective through continued operation of said manual means to lock the heel band in closed position on the shoe.

25. In a device of the class described, a jack for supporting a shoe involving a last spindle, a heel band, means for positioning the jack in operative relation to a shoe machine, means actuated from said positioning means to close the heel band, and means for locking the jack in position operated by further movement of said positioning means.

26. A device of the class described, comprising a jack mechanism mounted for oscillation about a pivot below the same and extending transversely thereof and also mounted for vertical movement, and means acting to raise and simultaneously oscillate said jack, said means acting by further movement thereof to lock the jack in position when the limit of the simultaneous actions is reached.

27. A device of the class described, comprising a last pin, a heel band, a frame supporting the same, said frame being mounted for oscillation about a pivot below the same and for vertical movement relatively to said pivot, and manually operable means acting simultaneously to raise said frame, to oscillate the same upon its pivot and to close said heel band upon the shoe and acting subsequently to lock said parts from further movement.

28. A device of the class described, comprising a frame, a movably mounted shoe support thereon; a heel band for embracing the heel portion of a shoe upon said shoe support, means for raising the said frame and simultaneously moving the same backwardly into operative relation beneath the shoe machine, means for closing said heel band, means for locking said positioning means and said heel band in position, and means constraining a point on said shoe support to movement in an elliptical path.

29. In a device of the class described, a frame, a shoe support mounted thereon, means for positioning and locking said support in operative relation to a shoe machine, and additional means for further adjusting said shoe support in position.

30. In a device of the class described, a shoe support, a frame upon which said support is mounted, said frame being mounted for oscillation forwardly and backwardly and for vertical movement, means for moving said frame upwardly and about said pivot simultaneously to position the same, and additional means for producing slight movements of the frame about said pivot for adjusting said position accurately.

31. In a device of the class described, a jack support, a lower plate pivoted to said support and having a slot in its upper face, an upper plate provided with a slot in its lower face at right angles to the slot in said lower plate, a block located between said plates and provided with pivoted means upon its upper and lower faces adapted to engage the slots in said upper and lower plates respectively, means for securing said plates together, and means for securing one end of said block upon said support.

32. In a device of the class described, a jack support, a lower plate pivoted to said support and having a slot in its upper face, an upper plate provided with a slot in its lower face at right angles to the slot in said lower plate, a block located between said plates and provided with pivoted means upon its upper and lower faces adapted to engage the slots in said upper and lower plates respectively, means for adjusting one of said pivots longitudinally of the block, means for securing said plates together, and means for securing one end of said block upon said support.

33. In a device of the class described, a support, plates secured together, spaced apart for a portion of their length and provided in said portion respectively with grooves at right angles to each other, a block fitted between said spaced apart portions and provided with means engaging said grooves and pivoted to said block, and means for holding said block stationary with respect to said plates.

34. In a device of the class described, a jack for supporting a shoe involving a last spindle, a heel band, means for positioning the jack in operative relation to a shoe machine, and means operated by further movement of said positioning means for locking the jack.

35. In a jack for shoes the combination of a band, levers arranged longitudinally of the shoe and connected to the ends of said band and to each other for equal and opposite movement, and means connected to one of said levers for forcing that lever lengthwise of the shoe and toward the toe to close the band upon the shoe.

36. A device of the class described having, in combination, a heel pin, a band for embracing the heel portion of a shoe, band closing levers substantially parallel to the shoe bottom connected to said band and to each other for equal and opposite movement, an operating lever connected to one

of said closing levers, and means for applying power to the operating lever to close the band upon the shoe by movement of the band closing levers toward the toe of the shoe.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD A. STIGGINS.

Witnesses:
NORMAN C. HUSSEY,
EVERETT W. VARNEY.

332

E. BROTHERS.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED JUNE 30, 1908.

1,135,945.

Patented Apr. 13, 1915.

6 SHEETS—SHEET 1.

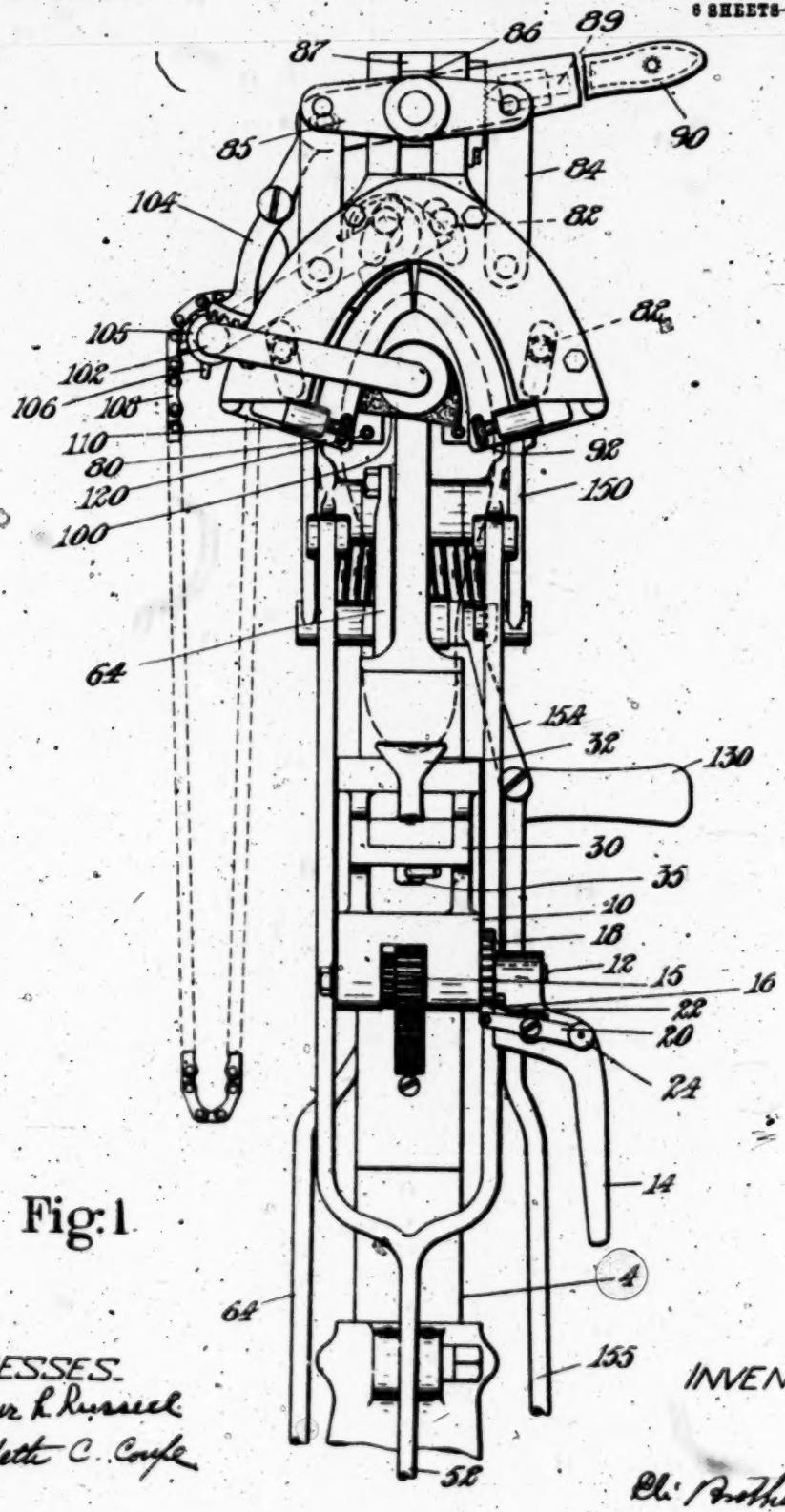


Fig. 1.

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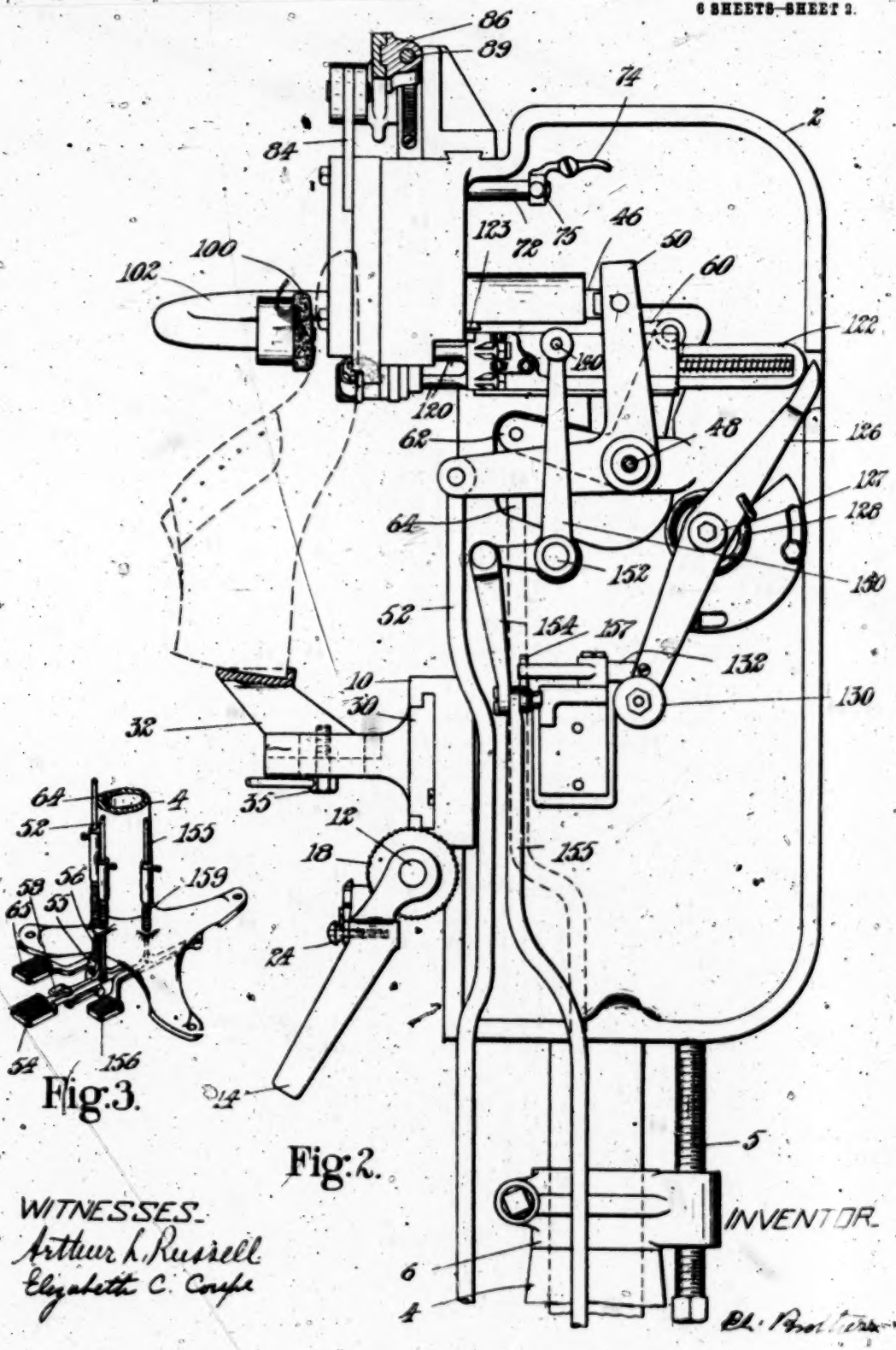


Fig. 2.

Fig. 3.

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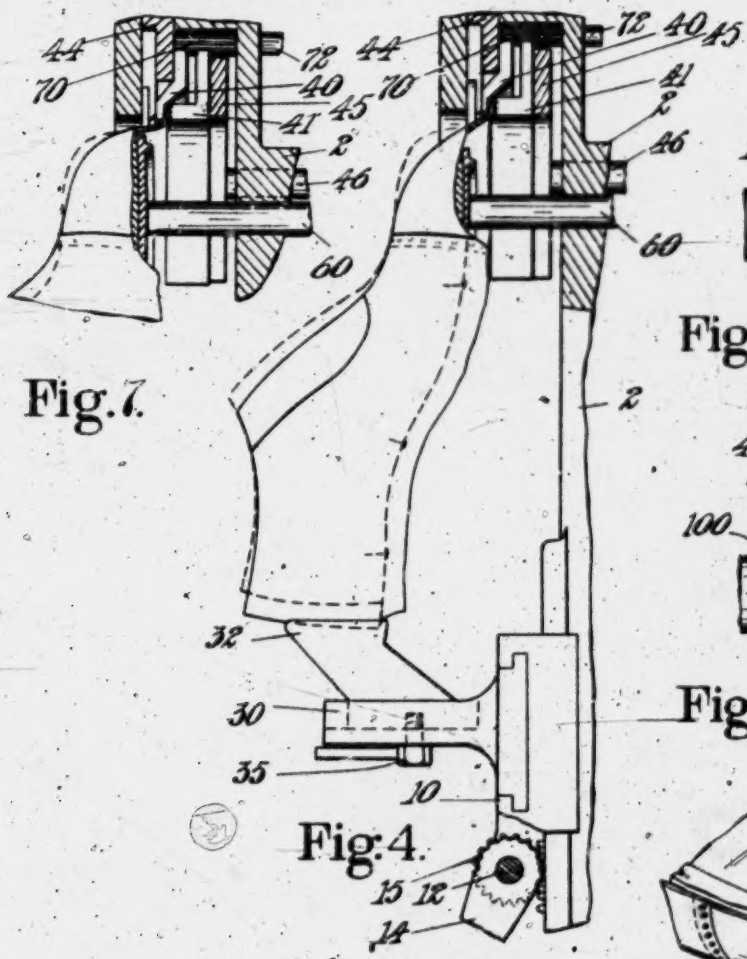


Fig. 7.

Fig. 4.

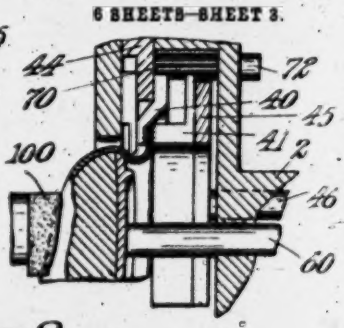


Fig. 8.

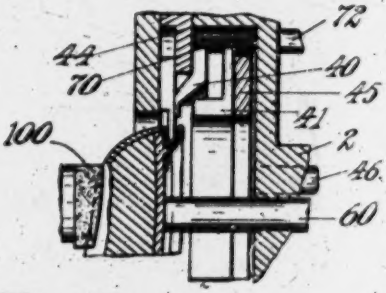


Fig. 9.

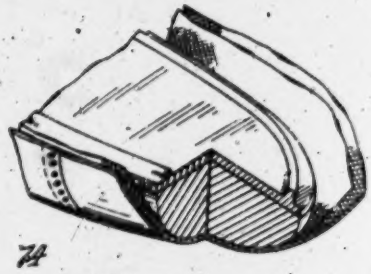


Fig. 5.

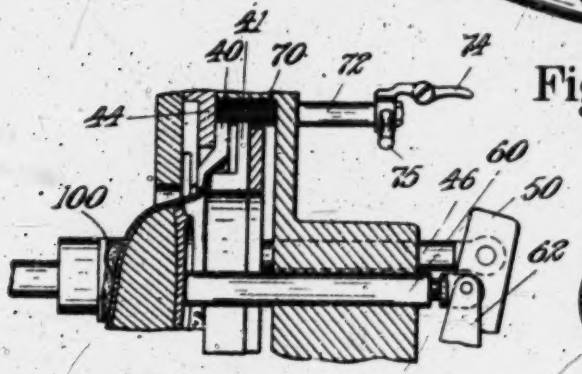


Fig. 6.

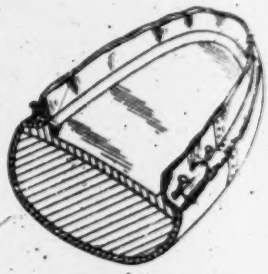


Fig. 10.

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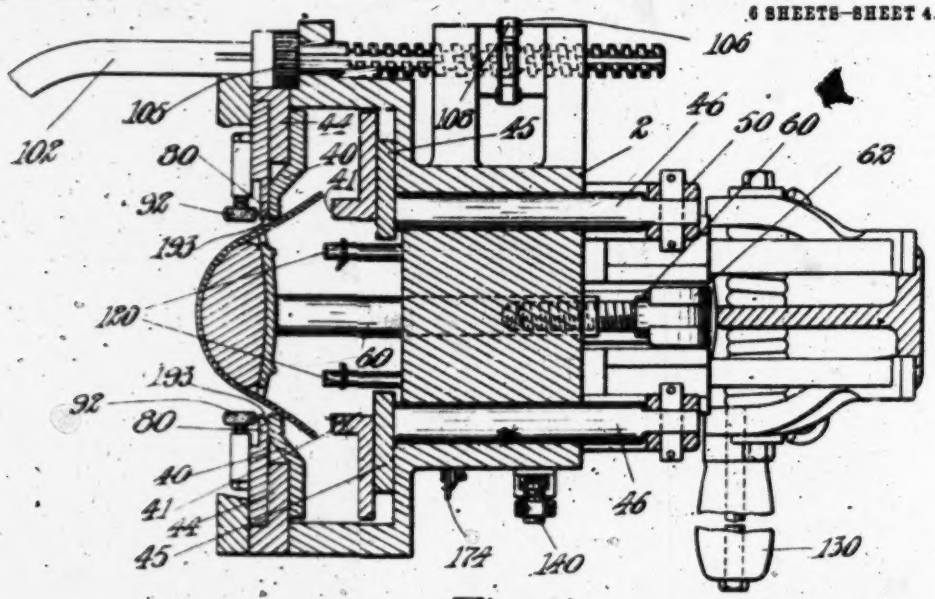


Fig. 11.

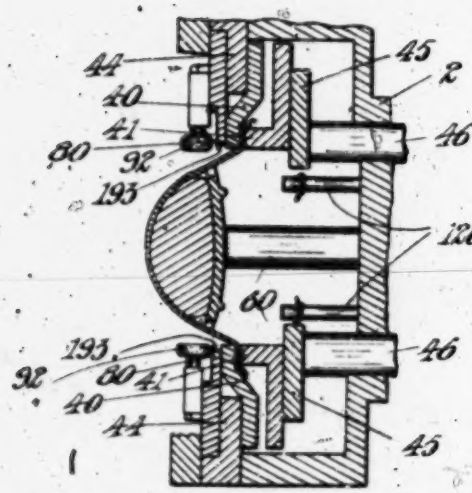


Fig. 12.

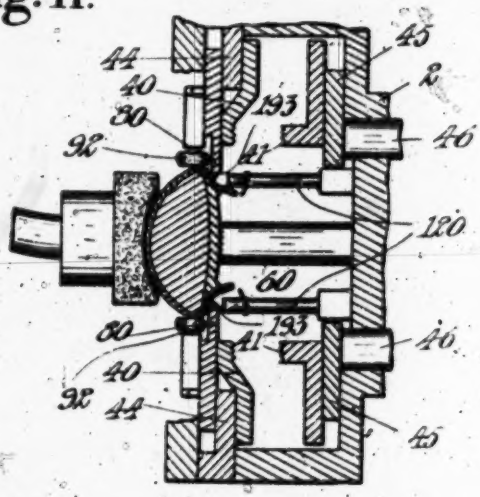


Fig. 13.

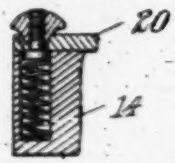


Fig. 14.

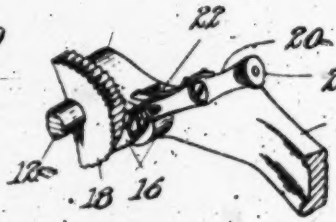


Fig. 15.

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MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

APPLICATION FILED JUNE 30, 1908.

1,135,945.

Patented Apr. 13, 1915.

6 SHEETS—SHEET 5.

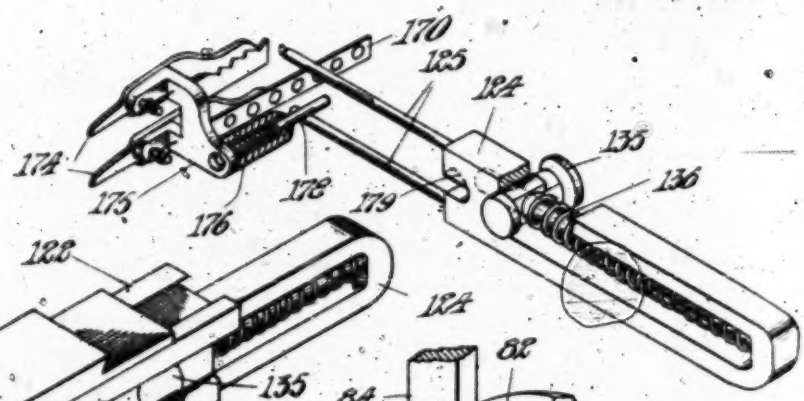


Fig. 17.

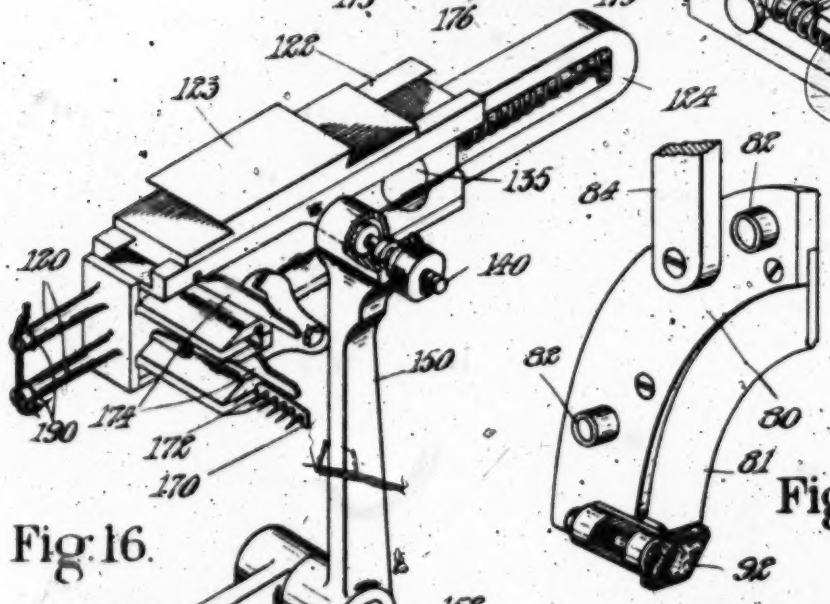


Fig. 16.

Fig. 18.

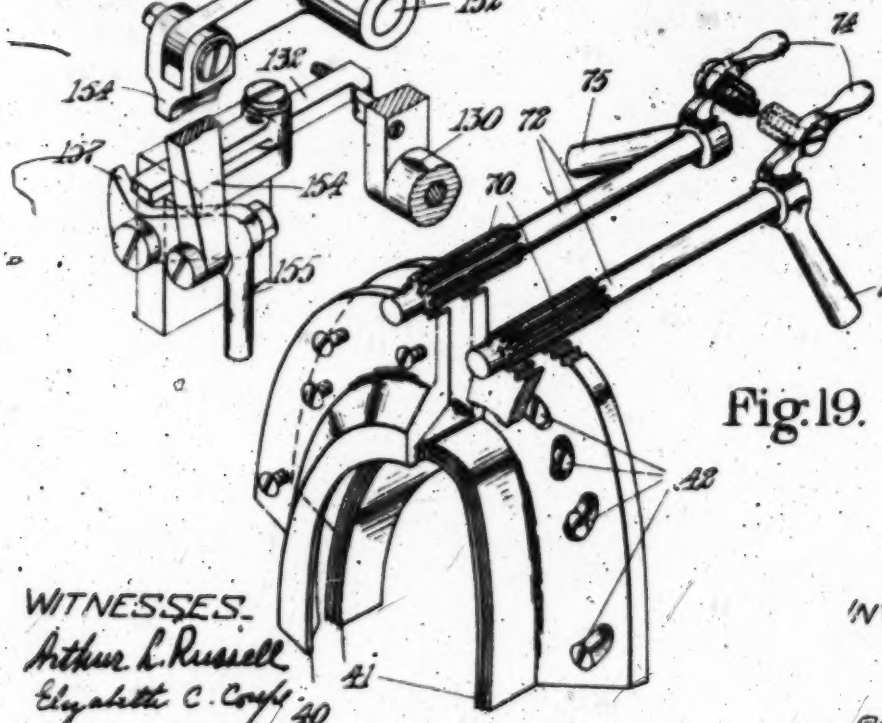


Fig. 19.

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APPLICATION FILED JUNE 30, 1908.

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Patented Apr. 13, 1915.

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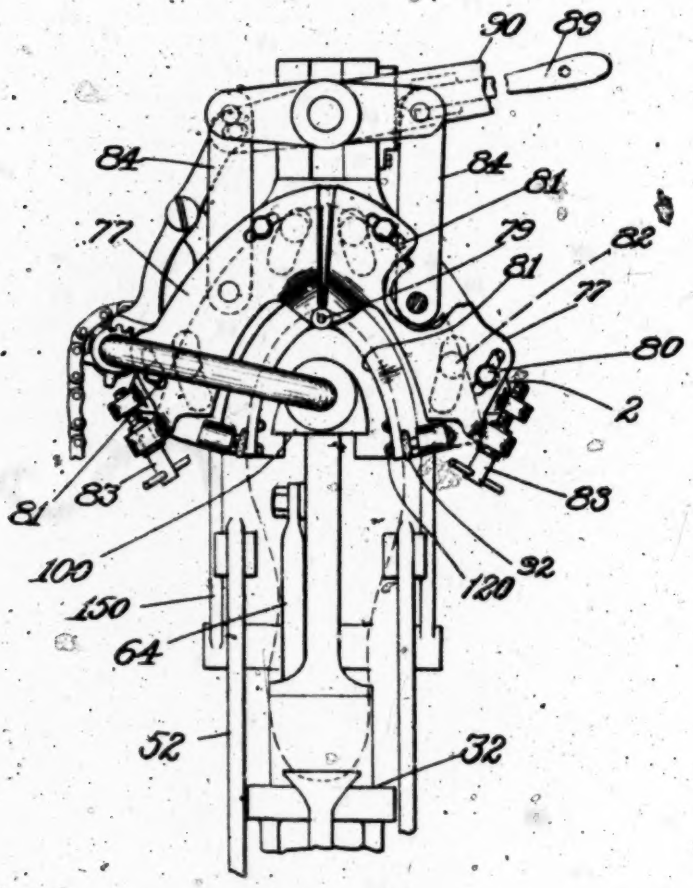


Fig. 20.

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UNITED STATES PATENT OFFICE.

ELI BROTHERS, OF LYNN, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

1,135,945. Specification of Letters Patent. Patented Apr. 13, 1915.

Continuation of application Serial No. 320,610, filed June 7, 1906. This application filed June 30, 1908. Serial No. 441,126.

To all whom it may concern:

Be it known that I, ELI BROTHERS, a citizen of the United States, residing at Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Use in the Manufacture of Boots and Shoes, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for working uppers over lasts and has for its general object to provide a machine by which in successive operations a shoe upper may be "pulled-over" or drawn into preliminary position and adjusted on the last and then "lasted" or finally conformed to the shape of the last, and this application is a continuation of an application for Letters Patent of the United States for pulling-over and lasting machines, Serial No. 320,610, filed June 7, 1906, so far as said two applications disclose common subject-matter.

It has heretofore been the practice to pull over a shoe by hand or by a pulling-over machine and thereafter to last the shoe in a lasting machine. The present invention combines in one machine provision for pulling-over the shoe and provision for lasting the shoe.

This invention has the advantage of reducing the number of machines or independent operations required for the manufacture of a shoe, thus economizing time and factory space and saving at least one handling of the shoe.

Another advantage of this invention is that the lasting of the shoe may be performed immediately after the pulling-over operation and it is, therefore, unnecessary to secure the upper by temporary fastenings for holding it between the pulling-over and lasting operations as has heretofore been necessary.

The invention has numerous other advantages which will be understood by those familiar with the manufacture of shoes, some of which advantages will be hereinafter pointed out.

As I am advised it is new with me to provide a machine in which a shoe upper and a last can be relatively moved to stretch the upper and to adjust it with its lines—as, for example, the toe tip seam—in desired relation to the last and which is provided with means for lasting the shoe.

One important feature of this invention consists in novel mechanism for pulling-over a shoe, comprising means for gripping the upper at opposite sides of the last and means for relatively actuating the gripping means and the last to pull the upper, said mechanism having provision for allowing relative movement of the last and upper to adjust the last with relation to the upper. As herein shown the last is rested against an abutment about which the last may be moved as a fulcrum or pivot for adjusting it with relation to the upper held by the grippers. In the illustrated embodiment of the invention the machine is constructed and arranged to present unobstructed space about the bottom and sides of the last to allow for movement of the last. This construction permits the last to be turned about an axis extending in the direction of the thickness of the last. This adjustment may be useful for straightening the last and toe tip seam relatively. The last may also be turned about an axis extending lengthwise of the shoe. By this means the relative pull on the two sides of the upper may be varied or the last may be shifted rotatively in the upper for positioning the last transversely with relation to the median line or lace opening of the upper. A further adjustment of the last may be made by tipping the last about an axis extending transversely of the last bottom. In this way the upper may be tightened or slackened as to its longitudinal strain over the top of the last. In addition to these movements the last may be adjusted lengthwise in the upper—as, for instance, to position the toe tip seam and the end of the last relatively. In practice it is important that the toe tip seam of each shoe of a pair of shoes be located at the same distance from the end of the shoe and it is the custom of hand workmen in pulling-over shoes to apply a measuring instrument to each shoe and then to pull the uppers longitudinally until each tip seam is in the same position.

In accordance with a feature of this invention the machine is provided with a heel engaging member and with manually operated means for actuating it to move the last longitudinally with relation to the

grippers which hold the upper whereby lengthwise adjustment of the last and upper relatively can be effected. Preferably the grippers are constructed and arranged to hold the upper away from the sides and edges of the last whereby the last can be moved more readily under or with relation to the upper. As herein shown, the grippers engage the upper at the end and at opposite sides of the forward portion of the last and are formed with substantially continuous curved jaws for receiving the edge of the forward portion of the upper from one side around the toe end to the other side. The curvature of the gripper jaws is preferably greater than that of the end of the last so that the jaws are adapted to receive in its normal outstanding or flaring position the marginal portion or edge of an upper loosely applied to the forward portion of a last.

These features of the invention are believed to have great advantages in a machine of this class, particularly in facilitating the making of the shoe without forming wrinkles in the upper.

A valuable characteristic of the preferred construction of the machine is that the several parts of the mechanism are arranged to permit to the operator an unobstructed view of the top and preferably also the side faces of the shoe so that he may be aware, as the operation proceeds, of the fit and position of the upper upon the last and may tip or rock the last as may be required to correct any defects that may be observed in fit of the upper or make any adjustments that may be required. As shown the abutment for the last is the part which is actuated while the grippers have no movement to pull the upper. This abutment is manually moved as herein illustrated and this gives opportunity for the adjustments of the upper and last to be made while the pulling is being effected if desired and before the maximum pulling tension is applied to the upper. This arrangement for manual relative actuation of the abutment and the grippers to pull the upper also permits the tension on the upper to be relaxed to reduce the frictional engagement of the upper materials with the last and facilitate the adjustment of the last in the upper.

A further feature of this invention consists in forming in sections gripper jaws which together are shaped and arranged to adapt them to the curvature of the last. As herein shown, the jaws are formed in right and left sections which can be adapted to the shape of the last whereby wide and narrow lasts can be provided for and also crooked lasts in which the shapes of the two sides of the forward portion of the shoe differ from one another in the right and left lasts. The sectional jaws may be made readily removable so that one or both can at any time be replaced by another of different shape, but preferably and in accordance with a further feature of this invention which is believed to be of much importance in machines of this class the jaws are shiftable to adapt them to the contour of the last over which the upper is to be pulled and preferably the jaws are operatively connected with means by which they can be readily adjusted. The adjustment of the jaws or sections having opposed gripping faces may well be effected simultaneously and advantageously the adjustment of the sections at opposite sides of the shoe will be separately effected so that the jaws may be adapted to right and left crooked lasts. As herein shown, the jaws are secured on their carriers by pin and curved slot connections, the slots being formed to predetermine the direction of the movement of the jaws when they are adjusted in the illustrated construction to insure that the sections turn about an axis located substantially in the gripping faces so that a substantially continuous gripping face will be maintained by the several sections in their different adjustments. The jaws are shown as having toothed outer edges that are engaged by pinions on adjusting shafts and locking means is provided for securing the parts in their adjusted positions. The movable jaws or sections slide on the pinions in their opening and closing movements to grip and release the upper.

A further feature of the invention consists in the novel construction and relative arrangement of the mechanism for lasting the shoe after it has been pulled over. While in its broadest aspect, the invention is not limited to any particular form or arrangement of devices for lasting the shoe, as herein shown there are employed for this purpose wipers connected with actuating mechanism by which they are advanced lengthwise of the last and simultaneously closed inwardly from the opposite sides of the last to lay the upper over the last bottom. For sustaining the last against the pressure of the wipers a rest is provided which is movable longitudinally of the shoe from a position above and out of operative relation with the shoe. The top face of a shoe adjacent to its toe end is somewhat sloping and the rest is preferably arranged for movement along this sloping face until it comes into firm bearing with the shoe. By this arrangement the rest automatically adjusts itself into position for supporting against the pressure of the wipers shoes of slightly different thickness. The same end would of course be gained if the rest were movable in a guideway inclined to the plane in which the shoe stands. As herein shown, provision is made for actuating the rest

perpendicularly to the plane of the shoe bottom to force the shoe backward against the wipers for pressing the overlaid upper into place against the innersole.

A further broad feature of this invention consists in the coöperative relation which exists between the upper seizing and holding means and the wipers. This means is shown as comprising a member over which the marginal edge of the upper can be outspread and upon which the upper can be held by the other member to maintain the upper free from wrinkles while the wipers move under the holding means to lay the upper smoothly over the last bottom. These members, herein illustrated as curved sectional gripper jaws and frequently referred to as "jaws" for the purpose of designation without any intention to imply a limitation as to their construction, form means independent of the wipers for holding the upper at the toe outspread while the wipers advance and close. The action of the jaws in so holding the edge of the upper outspread and under tension prevents the formation of wrinkles while the wipers lay the upper over the last bottom. As shown in the accompanying drawings the upper gripping and holding jaws are substantially co-extensive with the wipers and they hold the upper outspread at the sides of the toe adjacent to the ends of the wipers and the tip seam, as well as around the end of the toe. The efficiency of the end portions of the wipers in lasting the upper tightly at the sides of the toe is greatly increased by holding the upper from slipping freely during the closing of the jaws at the sides of the toe. Advantageously the combination operates to hold the upper away from the side faces of the last near the edge of the last bottom while the upper is being stretched and until it is folded or wrapped across the edge of the sole. It is contemplated that while the wipers are being closed the upper holding pressure on the upper will be relaxed sufficiently to allow its edges to be pulled under tension from the jaws. The provision herein described for adjustment of the upper holding jaws enables them to be used in coöperation with wipers of varying shapes in lasting wide and narrow shoes or right and left crooked shoes.

The lasted upper may be secured in overworked position in any suitable manner and as herein shown means is provided for inserting tacks. These tacks may be driven at appropriate distances apart for holding the upper in lasted position, but preferably in machines designed for operating on welt shoes two tacks only will be driven at each side of the last and the wipers will form in the overworked upper material forced against the usual rib of the welt innersole an angular seat or crease to receive a wire, tape, or the like by which the upper between the tacks will be bound in lasted position.

These and other features of the invention, including certain details of construction and combinations of parts, will be hereinafter described and pointed out in the claims, but the improvements in methods of making shoes herein disclosed is claimed in a divisional application Ser. No. 851,194, filed July 15, 1914.

Figure 1 is a front elevation of a machine embodying the present invention. Fig. 2 is a side elevation. Fig. 3 is a perspective view of the lower portion of the machine showing the arrangement of treadles. Fig. 4 is a side elevation, partly in vertical section, showing the relative position of the parts when the upper has been gripped and pulled to some extent. The dotted lines indicate positions to which the shoe may be moved for varying the relative strains on different portions of the upper and adjusting the last and the upper relatively. Fig. 5 is a perspective view showing the forward portion of the upper loosely applied to the last and illustrating the normal outstanding relation of the upper to the side faces of the last. Figs. 6, 7, 8, and 9 show successive stages in the operation of pulling the upper, relatively adjusting the upper and the last, and working the whole upper over the last bottom into lasted position. Fig. 10 shows the forward portion of a shoe which has been pulled over and lasted by the machine. Fig. 11 shows a horizontal section through the machine and illustrates a shoe in position for the upper to be gripped. Fig. 12 shows the grippers closed and the abutment advanced to force the last forwardly and stretch the upper between the last and the grippers. Fig. 13 shows the wipers advanced to lay the upper over the last bottom, the grippers being open. This figure also shows the tack tubes advanced into position for the driving of the tacks. Figs. 14 and 15 are details of a pawl-controlling device. Fig. 16 is a perspective view of the tacking mechanism located at one side of the shoe. Fig. 17 is a perspective view of some of the parts shown in Fig. 16, other parts being omitted. Fig. 18 is a perspective view of one of the wipers and its associated parts, including the side clamp which is carried by the wiper. Fig. 19 is a perspective view of the grippers and their adjusting mechanism. Fig. 20 illustrates the application of a binder of continuous material for holding the upper in lasted position.

The machine comprises a head 2 which has a depending stem that extends into a post or base 4. A screw 5 working in a clamp 6 gives provision for adjusting the head to position the operating devices at a convenient height for the workman to see

the shoe for ascertaining the relation of the different parts of the upper to the last as the operation progresses. The clamp 6 may be tightened for securing the head in adjusted position. The head has on its front face an upright guide having a slide 10 in which is a shaft 12 having a hand lever 14 and a pinion 15 that engages a rack formed on the front face of the head whereby the height of the slide can be adjusted. A pawl 16 on the hand lever engages a fixed ratchet 18 to lock the lever and the pawl has a connection with a finger bar 20 which is pivoted to the hand lever 14 and acted upon by a spring 22. For manipulating the finger bar 20 a spring-pressed plunger is mounted in the lever 14 and has a tapering head 24 movable between the inclined walls of the finger bar so that when the head is depressed it turns the finger bar in the direction to lift the pawl from the ratchet. A block 30 is mounted for transverse movement in the slide 10 and carries the shoe rest 32, which in turn is mounted on a block for adjustment from and toward the machine. The rest is formed to receive the heel end of a shoe presented upright or toe upward, as shown in Fig. 2, and is arranged to support the shoe at a sufficient distance outward from the head of the machine to permit the workman to have a substantially unobstructed view of the sides as well as the top face of the shoe and also to be able to see the shoe bottom to a considerable extent if occasion requires. The adjustment of the rest inwardly and outwardly provides for properly positioning lasts of different shape—as, for example, lasts having more or less spring—and a handled clamping screw 35 is arranged to lock the rest in its adjusted position. The several arrangements for shifting the position of the rest permit it to be adjusted for differences in swing as well as spring of lasts so that the forward portion of different lasts may be presented in substantially the same relation to the devices for operating on the shoe which occupy a fixed or constant position in the machine.

The devices that operate on the shoe comprise gripper jaws 40, 40, 41, 41 adapted to grip the upper at the end and at the opposite sides of the forward portion of the last. The jaws are formed in accordance with the contour of the marginal portion of the upper as the latter, applied loosely to the last, flares outwardly from the side faces of the last, as shown in Fig. 5. The lower sectional jaw 40, 40 has a formed edge, Fig. 19, conforming substantially to the outline of the toe of the shoe to be lasted and is mounted at the rear or upper side of the wiper so that when the shoe is placed in the machine the outwardly flared marginal portion of the upper will be spread over it in position to be gripped against the formed edge of the jaw by the coöperating member, which is the jaw 41, 41. The upper is thus gripped and held independently of the wiper plates 80, later described, and their movement is not resisted by the pressure of the holding member 41, 41. It is to be noted that the jaw 40 does not move with the closing-in movement of the wiper plates, nor with their advancing movement, over the edge of the sole and therefore the edge of the upper is held outspread throughout the lasting operation and is prevented from wrinkling. These jaws are preferably formed in sections (as shown best in Fig. 19) which are arranged for relative adjustment to adapt the grippers for lasts of different widths or different shapes. The jaws 40 are shown as mounted by pin and curved slot connections 42 on a fixed portion 44 of the head. The jaws 41 are held by similar pin and curved slot connections to the movable plates 45, which are the heads of rods 46 through which the jaws 41 are actuated to seize and release the upper. The rods 46 are joined to the upper arms of bell cranks 50 which are fulcrumed at 48 on the head and are each pivoted to a forked upper end of a rod 52 that runs to a treadle 54. The treadle has a pawl 55 which engages a ratchet 56 on the post 4 and is actuated by a lever 58 arranged in the treadle to be engaged by the toe of the operator's foot resting on the treadle.

The jaws 40 are formed in transverse section or end elevation as shown in Figs. 4 and 11 with ribbed gripping faces on the marginal edge of the rear side and an outwardly flaring neck between the gripping face and the attaching portion for the purpose of accommodating the position of the outwardly flaring portion of the upper. The jaw 41 is angular in transverse view, as may be seen in said figures, with its gripping face on its forwardly projecting edge and presents a space to the neck of the coöperating jaw to facilitate the insertion of the upper preparatory to gripping it.

The relative movement of the grippers and the last for straining the upper is effected by forcing the last forwardly by an abutment or bottom rest 60, shown as a rod sliding in the machine head and connected at its rear end with a bell crank 62 that is joined by a rod 64 to a treadle 65. It is to be observed that the grippers receive the upper in its normal outwardly flared position so that no wrinkling or puckering of the edge of the upper is required for inserting it into the grippers. It will also be noted that in the illustrated construction the grippers make continuous engagement with the upper on the forward portion of the last from one side of the shoe around the toe end to the other side so that no wrinkle or fold

is permitted to form in the edge portion of the upper. The grippers hold the upper in its normal outwardly flaring position away from the side face of the last, as shown in Figs. 4 and 12, while it is strained over the top of the last to conform it to the irregular surface of the last with the least amount of friction and without opportunities for wrinkles to be started during the pulling-over operation. After the upper has been stretched or pulled or while it is being strained the last may be moved to effect proper relative adjustment of the last and upper for correctly positioning the upper with the lace opening or median line in the right location and with the toe tip seam or line straight and at the right distance from the toe end of the last. This adjustment is effected, as will be understood from the foregoing description of the machine, by moving the last with relation to the abutment. The sole-engaging end of the rest is so formed that the last may be easily rocked or turned sidewise about its lengthwise axis for shifting the last in the upper in a direction transverse to the last to locate the lace-opening, and said rest is also formed to permit the last to be turned upon its rest as a pivot, by swinging the heel laterally and thus turning the last within the upper for effecting a relative adjustment to straighten the toe tip seam. For accommodating these movements the bottom rest may advantageously have a single engaging face upon which the last may be easily moved. For relatively adjusting the last and upper lengthwise to position the tip seam at the desired distance from the toe end of the last or to stretch the upper lengthwise the last may be moved by the heel rest and its operating lever 14. By moving the last upwardly as indicated in dotted lines in Fig. 4 its toe portion is thrust into the gripped forward portion of the upper and while advancing stretches the upper lengthwise and conforms it tightly to the surfaces of the toe end of the last. The bottom rest may have a smooth face engaging the innersole to facilitate this adjustment of the last. For effecting the adjustment of the grippers which has been referred to these jaws are formed with teeth on their upper or outer edges, as shown in Fig. 19, and these teeth of each pair of jaws 40, 41 are engaged by one long pinion 70 formed on a shaft 72 which is rotatable in the head 2 and has an operating handle 75. The pinion permits the necessary sliding movement of the jaws 41 that is incident to their gripping and releasing action. The pins of the pin and curved slot connections 42 are preferably not set up tight, but permit the movement of the jaws by the shaft 72 at any time and the shaft has a ratchet that is engaged by a pawl 74 for locking the gripper jaws in their adjusted positions. The said curved slots are formed so that they compel the jaws in the adjusting movement to turn about a center which is located substantially at the point of contact of the jaws on one side with the jaws on the other side, whereby a substantially continuous gripping face is maintained in all adjustments of the jaws. It will be observed that the jaws on the two sides of the machine are independently adjustable so that they can be adapted to fit crooked lasts or lasts that have more swing on the right side of a right last and the left side of a left last than upon the opposite sides. The adjusting mechanism is so arranged that the jaws can be adjusted if desired after a shoe has been gripped.

The wipers 80 which represent, in the illustrated embodiment of the invention, the preferred means for forcing the upper into lasted position after it has been pulled over and adjusted upon the last are mounted in guideways in the front face of the machine head to which they are held by stud and slot connections 82, as indicated in Fig. 1. The wipers are connected by links 84 to an equalizing bar 85 pivoted on a block 86 that can slide vertically in the guideway 87 in the cap of the machine. The block is connected to a lever 90 provided with a spring pawl 89 adapted for engagement with a ratchet bar on the side of the cap for holding the lever and wipers in the positions to which they are moved and more particularly for maintaining the wipers in their raised position. The wipers have edge plates 81 which may be removably attached to the body portion of the wiper as shown in Fig. 18 so that they can be readily removed and replaced by others of different shape. In another construction shown in Fig. 20 the front plates 77, in which are located the slots of the pin and slot connections 82, are pivoted together at 79 at a point substantially concentric with the center of movement of the wipers and are connected to the head 2 by pin and curved slot connections at 811 the slots being formed concentric with the pivot 79. A screw 83 connects each of the plates 77 with the head, whereby said plates may be separately adjusted for positioning the wipers initially and independently of their operation by the hand lever 90. By this arrangement the wipers can be adjusted for shoes of different widths and can also be adjusted readily for right and left crooked lasts in the same manner as the grippers. The screws 83 have handle pins to facilitate their manipulation and enable the operator to adjust the wipers conveniently even after a shoe is in the machine and without the use of any machine tools. The wipers are actuated while the upper is held under tension by the jaws 40, 41, and in its normal, outwardly flaring position

where, as above stated, it is stretched without the formation of wrinkles. As the wipers close against the taut upper they force the upper over the edge of the last and innersole, as indicated in Figs. 8 and 9 and in Fig. 13, to the position in which it is shown in Fig. 10. In a shoe having a lip or shoulder on the face of the innersole, as in welt and turn shoes, the upper will be forced by the wipers into the angle between said lip or shoulder and the relatively thin feather edge of the innersole into position to be sewn to the lip or shoulder. As may be observed from Fig. 9, the wiper moves between the stationary jaw 40 of the grippers and the cover plate of the machine head and is braced by said stationary jaw to resist the pressure exerted on the last by the toe clamp. This arrangement insures that the wiper may be sufficiently rigid without making it of too great thickness to permit it to work advantageously between the grippers and the last. If the wiper were of greater thickness a greater length of upper material would be required in order that the upper should be securely seized by the grippers. The provision above described for adjusting the wiper plates permits them to be positioned so that they will seat the upper accurately into the angle between the lip and feather on shoes varying in width or shape and by adjusting the wiper plate on one side of the machine with relation to that on the other side the wipers may very quickly adapt themselves to the shape of right and left crooked lasts. While the wipers are closing the upper may be allowed to pull under tension from between the jaws of the grippers, which will be slightly released for this purpose, or the bottom rest may be gradually retracted so as to let the last approach the plane of the wipers to provide the length of upper required for bending it into lasted position over the innersole, or the necessary slack may be obtained both by retracting the abutment and by permitting the upper to pull from the grippers. In any case the upper is maintained under tension until it has become clamped between the wipers and the edge of the last and there is no opportunity offered during the pulling and lasting operation for the formation of wrinkles in portion of the upper that will be visible in the finished shoe. In the illustrated machine the operator manipulates the wipers manually as well as the bottom rest and the grippers so that the procedure may be varied and be suited to the conditions presented at different times and by different kinds of work. For example, if the upper is a short one it will usually be best to retract the bottom rest until the wiper clamps the upper rather than to allow the upper to pull from the grippers. The arrangement which permits the last to be rocked and rolled relatively to the bottom rest and to the wipers enables the operator to position lasts of different shapes with their bottom faces in operative relation to the plane of the wipers. In Fig. 7 the dotted lines indicate a rocking movement of the last by which the toe end is placed outside the plane of the wipers.

In making shoes on some styles of lasts, particularly those which have a deep concave on their top face over the ball of the foot, one of the most difficult portions to fit properly to the last and work snugly into lasted position is the portion extending over the said concave part of the last. It is particularly difficult to wipe this portion into lasted position without permitting it to slip back. For the purpose of overcoming this difficulty the wipers are herein shown as provided with side clamps 92 yieldingly mounted and normally held in position to clamp the upper against the side and edge of the last at about the toe tip seam for holding the upper from slipping back while it is being wiped into position at this point. These side clamps yield backwardly with relation to the wipers as the latter advance so that the holding force of the clamps is increased as the grippers release the upper. It is contemplated that a binder of continuous material will be employed for holding the upper in lasted position about the forward portion of the last and in order to fasten the upper with increased security at the ball of the last where it is most likely to slip back anchor tacks for the binder and also preferably one or more other tacks are inserted at each side of the ball in the region of the side clamps. The tack-inserting mechanism will be described later.

Provision for further conforming the upper to the concave portion of the last over the ball of the foot is found in a toe rest or clamp 100 which may comprise a relatively large block of yielding material, such as rubber, adapted to engage the top face of the shoe and be forced against the shoe for pressing the upper into the concave of the last and clamping it firmly against the last after the upper has been partially or completely pulled. The toe rest occupies during the pulling-over and adjusting operations an inoperative relation where it does not obstruct the view of the shoe,—as for example, the dotted-line position shown in Fig. 1. The clamp is mounted on a bent shank 102 by which the movement from inoperative to operative position may be effected. For convenience the shank 102 has operative connection with the lever 90 through which the wipers are actuated. This connection is formed by a lever 104 connected at its upper end by a pin and slot with the lever 90 and at its lower end formed with teeth to engage a pinion 105

which is keyed to the shank 102. The pin and slot connection between the levers 104 and 90 permits the toe rest or clamp to be moved into operative position by a partial downward movement of the wipers so that if desired the clamp may be moved into operative position before the wipers force the upper over the last bottom or come into a position to interfere with further adjusting and pulling of the upper. The said pin and slot connection permits the wipers to be further advanced for forcing the upper into lasted position without necessarily disturbing the position of the toe rest. For backing the rest up to clamp the shoe the shank has a coarse screw thread, shown best in Fig. 11, which is engaged by a sprocket wheel 106 that is located between collars on the head 2 so that it can have no movement lengthwise of the shank 102 but compels the wheel to project the shank endwise when the wheel is rotated. For turning the wheel a suitably formed endless chain 108 is provided which extends within convenient reach of the operator, as shown in Fig. 1. This arrangement gives sufficient speed and power to enable the operator to force the rest back quickly and firmly for forcing the upper into the concave of the last face and clamping it against the last and the last in turn against the abutment 60. Other purposes served by the toe rest 100 are that of holding the last against forward displacement by the wipers as the latter crowd the upper inwardly over the insole and that of forcing the last backwardly against the wipers after the latter have wiped the upper into lasted position. By thus forcing the last against the wipers the overlaid upper material may be firmly clamped and crimped into lasted position and any inequalities or irregularities in the portion of the upper overlying the feather of the innersole and between the lip and the edge of the shoe are well pressed out so that this portion of the upper is smooth and even and a well-defined edge is formed on the surface of the upper at the edge of the shoe.

The tack-driving mechanism heretofore briefly referred to is shown as comprising means for inserting four tacks, two being located on each side of the forward portion of the shoe and adapted to serve not only to fasten the upper at points of the greatest strain, but as anchor tacks for a binder by which the toe portion of the upper is held. Obviously a larger number of tacks might be driven and distributed about the entire forward portion of the shoe to secure the upper by tacks alone. The tack holders or nozzle 120 project from a tack block 122 that is shown best in Figs. 2 and 16 and receives a driver head 124 having driver bars 125. The driver head is engaged by the lever 126, see Fig. 2, on the hub of which is a coil spring 128 through which power is derived to insert the tacks. The lever 126 has a handle 130 to actuate it for compressing the driver spring 128 and a latch 132 for holding the lever forward with the spring under tension.

In order that the nozzles 120 may occupy during the pulling-over and lasting operations a retracted position where they will be out of the way of the parts employed during those operations the entire tack block 122 is arranged for movement toward and from the plane of the shoe bottom. To this end the tack block has tongue and groove connection with a plate 123 which in turn has a tongue and groove connection with the head of the machine. This latter connection permits a movement of the tacking mechanism transversely of the machine which will later be referred to. The driver head is yieldingly connected to the tack block through a cross bolt 135 and a spring 136 located in a slot in the head, as shown in Figs. 16 and 17. The tack block also has connection with an angle lever 150 fulcrumed at 152 and connected by a link 154 and a rod 155 with a treadle 156. A swinging arm 157 is connected to the head of the rod 155 to be actuated thereby for engaging the tail of the latch 132 and swinging that latch away from the driver 126 to release that lever and permit the insertion of tacks to take place. After the tacks have been driven the operator, by means of the handle 130, turns the lever 126 for setting the driver spring and a spring 159 acting on the rod 155 raises that rod and the parts connected with it to turn the swinging arm 157 out of the path of the latch 132, which is actuated by a suitable spring into position to lock the driver lever 126. It is important to locate the tacks always in substantially the same relation to the edge of the shoe and for accommodating shoes of different widths there is an adjustable connection between the tack block 122 and the lever 150 by means of which the tacking mechanism may be shifted transversely of the machine, the block 123 sliding in the machine head. This adjustable connection is formed by a screw 140 confined by suitable collars against lengthwise movement in the lever and having threaded connection with the tack block as shown best in Fig. 16. The head of the lever 126 is wide enough so that the lever maintains engagement with the driver head 124 in its different adjustments. The two driver levers 126 for the two sides of the machine are fast on the same shaft 127 so that both levers are set together by the handle 130 and are released together by withdrawing the pawl or latch 132. The tacks are supplied by strips 170 which are automatically fed through the guides 172 into the path of the drivers by ratchet bars 174 that engage the stems of

the tacks close to the strip. The ratchet bars are carried on a block 175 that is movable on the guides 172, being pressed inwardly by the spring 176 that surrounds a rod 178 and being pressed outwardly by the engagement of the end of said rod by an inclined face 179 on the driver head. It will of course be understood that the tacking mechanisms on the two sides of the machine are alike except that both are connected with a single lever 126 and the single treadle 156. The driver tubes are shown as provided with holders 190 that are adapted to receive a strand of binding material and hold it in position to be fastened to the shoe by the anchor tack as the latter is driven. The binding material may be a wire having a loop formed therein which may be located by the operator and supported by the holders 190 in such relation to the driver passage that the tack will be driven through the loop in the wire. The binder may also be a strand of tape or the like which will be supported across the end of the tube, as in Fig. 16, in position to have the tack driven through it. After the tacks have been inserted the strand of binding material thus anchored at one end to the shoe may be passed by the operator around the toe of the shoe to the opposite side and as the toe clamp is retracted slightly the binder may be drawn into holding position and then the shoe completely released from the machine, after which the operator may fasten the binder to the anchor tacks on the second side of the machine, or in case tape is used, he may insert manually a tack through the tape on the second side of the shoe to fasten it.

The operation of the machine, which has been largely explained in connection with the description of the several mechanisms, may be briefly restated to present it in a connected manner. The shoe may be prepared for the operation of the machine by applying an innersole to the last bottom where it will preferably be fastened by one or more tacks, as is customary. The upper is then loosely applied to the last, the fore part of the upper presenting with relation to the sides of the last substantially the appearance shown in Fig. 5. The shoe is then rested upon the heel support 32, the latter being shifted if necessary laterally, vertically, or forwardly to adapt its position for the size and the shape of the last upon which the particular shoe is to be made, it being understood that the position of the pulling-over and lasting instrumentalities is constant in the machine. The grippers may be adjusted if necessary by the shafts 72 to adapt them to the width and the shape of the particular shoe to be operated upon and likewise the wiper plates may be adjusted in accordance with the shape of the shoe in the machine and for considerable variations in the width of the shoe the tacking mechanisms may be shifted inwardly or outwardly by the adjusting devices 140. In presenting the shoe the outwardly flaring edges of the forward portion of the upper are thrust within the open jaws of the grippers in somewhat the manner suggested by Fig. 11. The formation of the jaws is well adapted for the reception of the upper in its normal outstanding relation to the sides of the last. The grippers are then closed by their operating treadle and locked by the pawl 55. The abutment or bottom rest 60 is then advanced by its treadle to force the last outwardly from the machine for stretching the upper. The grippers are formed, as will be understood from the several views, on a larger curvature than that of the last so that the upper is pulled obliquely away from the sides of the last, being stretched over the top face of the last to the contour of which it is thus conformed with a minimum frictional resistance to the pulling strain. The formation of the grippers to receive and hold the upper in its normal outstanding relation to the last enables the upper to be gripped and also to be pulled without crimping or folding it so that no wrinkles are formed while the upper is being pulled. It is also to be noted that the entire forward portion of the upper is pulled simultaneously, the grippers as shown having substantially continuous gripping faces extending about the forward portion of the shoe. The continuous gripping faces and the oblique pulling of the upper insure a uniform and simultaneous straining of the several portions of the upper over the last so that unequal tensions on adjacent portions of the upper tending to produce wrinkles are avoided. During or after the pulling of the upper the last may be shifted within the upper as has been described to any extent that may be required for properly positioning the upper on the last with the several lines, as the toe tip seam and the lace opening, in correct relation to the last. It will be observed that the arrangement is such that the abutment may be retracted more or less for relaxing the tension on the upper to permit the last to be easily adjusted within the upper or to be adjusted without such frictional engagement with the upper as would interfere with the relative movement which it may be desirable to effect between the upper and the last. The toe rest or clamp 100 is brought into position over the top face of the forward portion of the last by the lever 90 and then forced backwardly to clamp the upper against the top of the last, forcing it into the concave over the last ball. The upper having been pulled and adjusted into proper pulled-over position the wipers may be advanced to inclose the line of upper extend-

ing between the grippers and the last and by their continuous acting edge bend the upper inwardly over the last bottom without offering opportunity for the formation of wrinkles between the last and the wipers. The abutment may be retracted to permit the last to be drawn rearwardly by the action of the wipers and the grippers may be caused to relax their hold on the upper so that it may slip between them. The side clamps 92 come into holding engagement with the upper at the ball of the shoe before the upper is released and hold it at this point from slipping back. The toe rest or clamp may now be actuated to force the last backwardly against the wipers to form or mold the upper against the last bottom and set it in its lasted position. On account of the conditions under which the entire forward portion of the upper is simultaneously stretched in pulling it over and is then wiped into lasted position without opportunity for the formation of any wrinkles, and the described provision for compressing or conforming the marginal portion of the upper against the innersole in its lasted position, the upper is well molded to the contour of the last and conditions are most favorable for it to retain that shape after the shoe is completed. When the upper has been forced into satisfactory lasted position the wipers will be slightly retracted to permit the tacks to be driven and the treadle 156 will be depressed for first bringing the tack holders or nozzles 120 up to the last bottom and then tripping the latch 132 for causing the drivers to be actuated for inserting the tacks. If desired, the end of the binder may be placed in the holder 190 at one side of the machine to be anchored at that time by the tacks as they are driven. The binder may then be passed around the shoe and held under tension until the shoe has been taken from the machine, after which it may be fastened to one of the tacks on the other side of the shoe.

From the foregoing description of the illustrated machine and its operation the following important observations are to be noted: that the grippers constitute upper holding means over one member of which the margin of the toe portion of the upper which is to be lasted-in over the shoe bottom can be outspread in smooth unwrinkled condition; that the other member grips, that is, engages and holds by pressure, the margin in this smooth condition and said members maintain it smooth during the upper stretching and the overwiping operations of the machine; that the wipers are separate from the upper gripping members and move to carry the upper inwardly to lasted position while the margin or edge of the upper is maintained outspread in unwrinkled condition by the gripping members; that therefore the gripping members prevent the closing action of the wipers from "fulling" the upper and forming wrinkles in it as the upper is laid over the edge of the shoe bottom.

It has heretofore been proposed to hold the upper against the wipers by a "retarder". In the use of such a combination, in which the lower member of the holder is formed by the closing wipers, the upper is fulled by the movement of the wipers instead of being maintained in its outspread condition and the smooth lasting obtained by this invention cannot be secured. A particular advantage gained by the present invention is that the upper holding jaws, which are preferably independent of the toe wipers, prevent the upper at the sides of the toe from being carried backwardly toward the heel by the backward swinging of the wipers in their curvilinear movement, thus preventing the fullness frequently found at the extreme ends of the toe wipers, and if the upper holding jaws do not close with the wipers over the sides of the toe said jaws will produce tighter stretching of the upper under the extreme rear portions of the wipers than heretofore has been obtained.

In the provision and arrangement of upper holding members and wipers to secure the above mentioned results in lasting the toe portion of the upper without wrinkles is to be recognized important features of this invention.

Having explained the nature of this invention and described a construction embodying it in the best form now known to me, I claim as new and desire to secure by Letters Patent of the United States:—

1. A machine for working an upper over a last having in combination, means for pulling-over the shoe including means permitting relative adjustment of the upper and last, and means for lasting the shoe while the shoe remains the same side up in the machine as at the end of the pulling-over operation.

2. A machine for working an upper over a last having, in combination, mechanism for gripping the upper of the forward portion of the shoe and pulling-over the shoe, including means permitting relative adjustment of the upper and last, means for lasting the upper from a point on one side of the toe around the toe to a point on the other side of the toe, and means for inserting fastenings to secure the upper in pulled and lasted position.

3. A machine for working an upper over a last with an innersole on its bottom face having, in combination, means for pulling-over the shoe, including means permitting relative adjustment of the upper and last, means for lasting a continuous section of the

fore part of the shoe, and means for securing the lasted upper to the innersole.

4. A machine for working an upper over a last having, in combination, means for pulling over the shoe including means permitting relative adjustment of the upper and last, and means for lasting a continuous section of the upper extending completely around the toe of the shoe, said machine being constructed and arranged to permit the operator to have a substantially unobstructed view of the top face of the shoe during the operation of the pulling and lasting means thereon.

5. A machine for working an upper over a last arranged to support the shoe in upright position with the top face of the shoe toward the operator and having, in combination, means for pulling-over the shoe, and wipers arranged to act upon the pulled upper while the upper is held under tension by the pulling-over means to force the upper into lasted position upon the last bottom.

6. A machine for working an upper over a last having, in combination, means for gripping the forward portion of the upper and pulling it on the last including means permitting relative adjustment of the upper and last, wipers, and means for actuating the wipers to work a continuous section of the upper extending around the toe into lasted position while the shoe remains in the position that it occupied at the end of the pulling-over operation.

7. A machine for working an upper over a last having, in combination, means for gripping the forward portion of the upper and pulling it over the last, wipers, and means for actuating the wipers to work the upper into lasted position, said machine having provision for relatively moving the wipers and the last perpendicularly to the plane of the last bottom to clamp the upper against the last bottom during the lasting operation.

8. A machine for use in the manufacture of boots and shoes having, in combination, means for pulling an upper over a last arranged to permit relative adjustment of the last and the pulled upper, and means for working a continuous section of the upper extending around the toe into lasted position.

9. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive at the toe end and at the opposite sides a substantial distance from the toe end of a shoe the upper in its normal outwardly flared position relatively to the forward portion of the last and pull the upper on the last, and independently actuated means for lasting the upper.

10. A machine for working an upper over a last having, in combination, gripping means provided with substantially continuous gripping faces flared outwardly to seize the upper at the toe end and for a substantial distance along the opposite sides of the shoe in its normal outwardly flared position and pull it over the last, and independently actuated means for lasting the upper of the forward portion of the shoe.

11. A machine for working an upper over a last having, in combination, gripping means provided with substantially continuous gripping faces formed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and for a substantial distance along the sides of the forward portion of the shoe and to pull the upper on the last, and independently actuated wipers arranged to embrace the forward portion of the shoe and force the upper into lasted position.

12. A machine for working an upper over a last having, in combination, gripping means, an abutment for the last, means for actuating said abutment and gripping means relatively to pull the upper over the last, and means for forcing the pulled upper into lasted position, said machine having provisions for relaxing the pulling tension on the pulled upper at the toe and at both sides of the last simultaneously and for relatively moving the upper and last to adjust the upper while the tension is relaxed.

13. A machine for working an upper over a last having, in combination, means for pulling an upper over the last and means for working the pulled-over upper into lasted position, said machine being arranged to permit relative adjustment of the last and the pulled upper and having provision for relaxing the tension on the pulled upper at the toe and at both sides of the last simultaneously while the adjustment is being made.

14. A machine of the class described having, in combination, means for supporting a shoe with the toe uppermost in position to present to the operator a substantially unobstructed view of the upper on the top face and the sides of the last, means for pulling over the shoe, and means for forcing the pulled over upper into lasted position while the shoe remains in substantially the same position.

15. A machine of the class described having, in combination, means for supporting a shoe in substantially upright position with the toe uppermost in position to present to the operator a substantially unobstructed view of the upper on the top face and the sides of the last, means for pulling the upper over the last, and means for driving tacks in position to fasten the upper.

16. A machine of the class described having, in combination, means for supporting

a shoe in substantially upright position with the toe uppermost in position to present to the operator a substantially unobstructed view of the upper on the top face and the sides of the last, means for pulling the upper over the last, means for actuating the last and the pulling means relatively to adjust the upper upon the last, and means for fastening the upper.

17. A machine of the class described, having, in combination, means for supporting a shoe in position to present to the operator a substantially unobstructed view of the upper on the top face and the sides of the last, means for pulling the upper over the last, means for actuating the last and the pulling means relatively to adjust the upper upon the last, and means for lasting the pulled and adjusted upper.

18. A machine of the class described having, in combination, means for supporting a shoe in position to present to the operator a substantially unobstructed view of the upper on the top face and the sides of the last, and means for pulling the upper over the last, said supporting means including a member that is arranged for movement in one direction to effect the pulling of the upper and a member that is movable in a different direction to effect adjustment of the last in the pulled upper.

19. A machine of the class described having, in combination, means for supporting a shoe with the toe in upright position, grippers for pulling the upper constructed with substantially continuous gripping faces arranged to receive the marginal edge of the upper at the end and opposite sides of the shoe, and means for forcing the upper into lasted position.

20. A machine of the class described having, in combination, means for supporting a shoe in upright position, grippers for pulling the upper constructed with substantially continuous gripping faces arranged to receive the marginal edge of the upper at the end and opposite sides of the shoe, means for relatively actuating the grippers and support to pull the upper, means for forcing the upper into lasted position, and means for inserting fastenings to secure the upper.

21. A machine for use in the manufacture of boots and shoes having, in combination, means for pulling an upper over a last arranged to permit relative adjustment of the last and the pulled upper transversely of the last, and means for working the upper into lasted position.

22. A machine for use in the manufacture of boots and shoes having, in combination, means for pulling an upper over a last, and means for working the upper into lasted position, said machine being constructed and arranged to permit relative adjustment of the last and the pulled upper longitudinally of the last between the pulling and the lasting operations.

23. A machine for use in the manufacture of boots and shoes having, in combination, means for pulling an upper over a last and having provision for moving the last within the pulled upper to effect relative adjustment of the last and upper, and means for working the upper into lasted position.

24. A machine of the class described having, in combination, means for gripping the upper at the end and the opposite sides of the forward portion of a last, an abutment for the last bottom, means for relatively actuating the gripping means and the abutment to pull the upper, said machine being constructed and arranged to permit movement of the last upon the abutment as a fulcrum to adjust it within the pulled upper, and means for inserting tacks at the opposite sides of the shoe to secure the upper.

25. A machine of the class described having, in combination, means for gripping the upper at the end and the opposite sides of the forward portion of a last, an abutment for the last bottom, means for relatively actuating the gripping means and the abutment to pull the upper, said machine being constructed and arranged to permit movement of the last upon the abutment as a fulcrum to adjust it within the pulled upper, and means for working the upper into lasted position.

26. A machine of the class described having, in combination, means for gripping the upper at the end and the opposite sides of the forward portion of a last, an abutment for the last bottom, and means for relatively actuating the gripping means and the abutment to pull the upper, said pulling means being constructed and arranged to pull the upper at the sides and the end of the last outwardly at an oblique angle to the plane of the last bottom.

27. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment in a plane substantially perpendicular to the last bottom to stretch the upper.

28. A machine for working an upper over a last having, in combination, gripping means constructed with substantially continuous gripping faces and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom,

and means for relatively actuating the grippers and the abutment in a plane substantially perpendicular to the last bottom.

29. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper, said machine having provision for further relative movement of the last and the grippers to adjust the upper about the last.

30. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper over the last, said machine having provision for permitting relative movement of said grippers and the last to adjust the upper upon the last.

31. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper over the last, a rest for the heel of the last movable manually while the upper is under tension, and means for locking the rest.

32. A machine for working an upper over a last having, in combination, means for gripping the upper at opposite sides of the forward portion of the last, and means, including an abutment for the last, for relatively moving the grippers and last to pull the upper, said machine having provision for permitting movement of the last sidewise relatively to the gripped upper.

33. A machine for working an upper over a last having, in combination, means for gripping an upper at opposite sides of the forward portion of the last, and means, including an abutment for the last, for relatively moving the grippers and last to pull the upper, said machine having provision for permitting movement of the last about a center in the forward portion of the last to adjust the last and upper relatively.

34. A machine for working an upper over a last having, in combination, means for gripping the upper at opposite sides of the forward portion of the last, and means for relatively moving the grippers and last to pull the upper, said machine including an abutment for the last about which the last may be turned to adjust the last and upper relatively.

35. A machine for working an upper over a last having, in combination, means for gripping the upper at opposite sides of the forward portion of the last, and means, including an abutment for the last, for relatively moving the gripping means and last to pull the upper, said machine having provision for permitting turning movement of the last relatively to the gripped upper about an axis extending longitudinally of the shoe.

36. A machine for working an upper over a last having, in combination, means for gripping an upper at opposite sides of the forward portion of the last, and means, including an abutment for the last, for relatively moving the grippers and last to pull the upper, said machine having provision for permitting movement of the last relatively to the gripped upper about an axis extending transversely across the last bottom.

37. A machine for working an upper over a last having, in combination, means for gripping an upper at opposite sides of the forward portion of the last, means for relatively moving the grippers and last to pull the upper, a heel rest, means for actuating the heel rest to adjust the last longitudinally in the pulled upper, and means for forcing the upper into lasted position about the forward portion of the last.

38. A machine for working an upper over a last having, in combination, means for gripping the upper at opposite sides of the forward portion of the last, an abutment for the last, means for relatively actuating the abutment and gripping means to pull the upper, said last being free to be turned laterally about said abutment for adjusting the last relatively to the gripped upper.

39. A machine for working an upper over a last having, in combination, an abutment for the last, gripping means constructed and arranged for engaging the upper at opposite sides of the forward portion of a last and holding the upper laterally away from the side faces of the last, and means for relatively actuating the gripping means and abutment to pull the upper, the machine being constructed and arranged to permit the last to be swung laterally about said abutment as a center.

40. A machine for working an upper over a last having, in combination, grippers constructed and arranged to engage the upper at the end and at opposite sides of the last, an abutment for the bottom of the last about which the last may be rocked forwardly and backwardly to vary the pull on the upper at the end of the last, and means for relatively

moving the grippers and abutment substantially perpendicularly to the last bottom for pulling the upper.

41. A machine for working an upper over a last having, in combination, grippers constructed and arranged to engage the upper at the end and at opposite sides of the last, an abutment engaging the bottom of the last, and means for relatively moving the grippers and last for pulling the upper, said machine being constructed and arranged to permit movement of the shoe relatively to the abutment about an axis extending longitudinally of the last.

42. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, means for relatively actuating the grippers and the abutment to stretch the upper, and means for thereafter forcing the upper into lasted position over the last bottom.

43. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, means for relatively actuating the grippers and the abutment to pull the upper, and means presenting a substantially continuous acting edge to engage the outwardly stretched upper and force it inwardly to lasted position upon the last bottom.

44. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, means for relatively actuating the grippers and the abutment in a plane substantially perpendicular to the last bottom, and wipers for forcing the upper inwardly to and over the edge of the last.

45. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, means for relatively actuating the grippers and the abutment to stretch the upper, and means for forcing the upper inwardly to lasted position upon the last bottom, said stretching instrumentalities being constructed and arranged to maintain the upper under tension until it is clamped to the last bottom.

46. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment in a plane substantially perpendicular to the last bottom to stretch the upper, said machine having provision for thereafter forcing the outwardly stretched upper inwardly to and over the edge of the last into lasted position, while maintaining it under tension.

47. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper, said machine having provision for relative movement of the last and the grippers to adjust the upper, and means for forcing the upper into lasted position.

48. A machine for working an upper over a last having, in combination, gripping means constructed and arranged to receive in outwardly extending position the marginal portion of the upper at the end and sides of the forward portion of the shoe, an abutment for the last bottom, means for relatively actuating the grippers and the abutment to stretch the upper, and means for forcing the upper into lasted position.

49. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper over the last, said machine being constructed and arranged to permit the last to be moved upon the abutment as a fulcrum to shift it within the upper while the latter is held by the grippers.

50. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper over the last, said machine being constructed and arranged to permit the last to be turned upon the abutment to vary the relative strains on different portions of the upper.

51. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last, an abutment arranged to engage the bottom of the last at a substantial distance back from the end, and means for actuating the abutment to stretch the upper between the last and the grippers.

52. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last, an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper over the last, said machine having provision for further moving the last endwise relatively to the grippers.

53. A machine for working an upper over a last having, in combination, gripping means located at the sides and the toe end of the shoe constructed and arranged to receive in its normal, outwardly flared position the marginal portion of the upper placed loosely upon the last an abutment for the last bottom, and means for relatively actuating the grippers and the abutment to stretch the upper over the last, a rest for the heel end of the last arranged for movement endwise of the last and also laterally thereof, and means for actuating the heel rest.

54. A machine for working an upper over a last having, in combination, grippers for seizing the upper, an abutment for the last bottom, means for actuating the abutment to effect the pulling of the upper, and wipers for forcing the upper into lasted position over the last bottom, said actuating means being arranged for movement under control of the workman to permit displacement of the last toward the grippers as the wipers bend the upper over the last bottom.

55. A machine of the class described, having, in combination, devices for pulling the upper at an oblique angle to the last bottom and for laying it into lasted position over the last bottom, an abutment for the last bottom, and means under control of the operator for actuating the abutment to effect a movement of the last from said devices during the pulling of the upper and for actuating the abutment toward said devices during the overlaying of the upper.

56. A machine for working an upper over a last having, in combination, means for engaging the upper, means for engaging the last, means for relatively actuating said engaging means to pull the upper about the last, said machine being constructed and arranged to permit the last to be adjusted in the pulled upper for positioning it with relation to the lines of the upper, and wipers for forcing the marginal portion of upper over into lasted position upon the last bottom.

57. A machine for working an upper over a last having, in combination, grippers formed with substantially continuous gripping faces to engage the upper from one side of the shoe around the toe to the other side of the last, means for closing the grippers, means for relatively actuating the grippers and last to stretch the upper, means to wipe the upper over the bottom of the last, and means for inserting fastenings to secure the upper.

58. A machine for pulling-over and lasting the forward portion of a shoe having, in combination, grippers constructed and arranged to have continuous engagement with the upper from one side of the forward portion of the last around the toe to the other side of the last, means for closing the grippers, means for relatively actuating the grippers and last to stretch the upper, wipers constructed and arranged to have continuous engagement with the upper about the forward portion of the last, and means for advancing the wipers relatively to the grippers and for closing the wipers to lay the upper over the last at the end and sides of the forward portion.

59. A machine for pulling-over and lasting the forward portion of a shoe having, in combination, grippers having a configuration corresponding to the outstanding edge portion of upper material at the forward portion of a last, means for closing the grippers, means for relatively moving the last and grippers substantially perpendicularly to the last bottom to stretch the upper, and means for laying the upper over the last bottom, said machine having provision for relative movement of the grippers and the last to adjust the upper upon the last between the pulling and the overlaying operations.

60. A machine of the class described having, in combination, pulling over means comprising grippers for engaging the upper at the toe end and at opposite sides of the last and arranged to pull the upper free from the side faces of the last, wipers for forcing the upper into lasted position, and shoe supporting means, including an abutment for the forepart of the shoe, which is arranged to permit the last to be rocked to aline the plane of the last bottom relatively to the plane of the wipers.

61. A machine for pulling over and lasting a shoe having, in combination curved grippers to engage the upper of the forward portion of a shoe, said grippers having a curvature of longer radius than the curvature of the forward portion of the last, means for closing the grippers, means for relatively

moving the last and grippers substantially perpendicularly to the last bottom to stretch the upper, and means for laying the upper over the last bottom.

63. A machine for pulling-over and lasting a shoe having, in combination, grippers constructed and arranged to engage the upper at the sides and end of the forward portion of a shoe and having a configuration corresponding to the outstanding edge portion of an unlasted upper at the forward portion of the shoe, means for relatively moving the last and grippers to pull the upper upwardly and outwardly, wipers, and means for actuating them independently of the grippers to force the pulled upper over the last bottom simultaneously at the sides and end of the forward portion.

~~63. A machine~~ for pulling-over and lasting a shoe having, in combination, grippers constructed and arranged to engage the upper of the forward portion of a shoe at the end and at the sides of the last, means for relatively moving the grippers and last to pull the upper in lines oblique to the side and end faces of the last, and means for laying the upper over the bottom of the last; said machine having provision for relative movement of the grippers and the last to adjust the upper between the pulling and overlaying operations.

64. A machine for pulling-over and lasting a shoe having, in combination, curved grippers constructed and arranged to engage the upper at the sides and end of the forward portion of a last and to pull the upper upwardly with relation to the bottom of the last and outwardly with relation to the side faces of the last, means for relatively moving the last and the grippers, wipers, and means to actuate the wipers longitudinally and transversely of the last to lay the upper over the innersole simultaneously at the sides and end of the forward portion of the last.

65. A machine for pulling-over and lasting a shoe having, in combination, grippers comprising an outer member longitudinally curved to extend around the forward portion of a last and formed to receive the edge of the upper material of the forward portion of the shoe in its normal outstanding position, an inner gripper member of similar shape, means for actuating the inner member to clamp the upper against the outer member, means for relatively actuating the last and the grippers to pull the upper, wipers constructed and arranged to embrace the upper between the grippers and last, and means for advancing and closing the wipers to lay the upper over the last bottom.

66. A machine for pulling-over and lasting a shoe having, in combination, grippers and actuating mechanism therefor, means for moving the last away from the grippers to stretch the upper, wipers for laying the upper over the bottom of the last, and a rest for the heel end of the last movable relatively to the wipers into and out of position to support the last against the pressure of the wipers.

67. A machine for pulling-over and lasting a shoe having, in combination, grippers and actuating mechanism therefor, means for moving the last away from the grippers to stretch the upper, wipers for laying the upper over the bottom of the last, a rest for the heel end of the last movable relatively to the wipers into and out of position to support the last against the pressure of the wipers, and means for holding the rest in an inoperative position.

68. A machine for pulling-over and lasting a shoe having, in combination, grippers, wipers, an abutment for the last, means for actuating the abutment to move the last away from the grippers and into operative relation to the wipers, means for actuating the wipers, and a heel rest arranged to be moved into position to support the last against the action of the wipers.

69. A machine for pulling-over and lasting a shoe having, in combination, means for pulling the upper over the last, wipers for laying the upper over the last bottom, a toe rest adapted to engage a top face of the shoe and movable in the plane of its resting face into and out of operative relation to the shoe, and means for actuating the rest substantially perpendicularly to said top face of the shoe for pressing the shoe rearwardly toward the wipers.

70. A machine of the class described having, in combination, manually operated mechanisms for working an upper over a last, and means under the control of the operator for inserting tacks simultaneously at opposite sides of the last.

71. A machine of the class described having, in combination, manually operated mechanisms for stretching an upper and laying it over a last, tack-inserting mechanisms having provision for automatically feeding tacks, and means under control of the operator for actuating the tacking mechanism to insert a plurality of tacks simultaneously at opposite sides of the last.

72. A machine of the class described having, in combination, means for working an upper over a last, and tack-driving mechanism which as a whole is automatically movable perpendicularly to the plane of the shoe bottom from a position out of the way of the overworking means into a position adjacent to the surface of the shoe bottom and means for actuating said mechanism to insert tacks.

73. A machine of the class described having, in combination, means for engaging the upper, means for engaging the last, means

for actuating the latter to move the last for stretching the upper, and tack-driving mechanism including a tack guide movable substantially perpendicularly to the tack-receiving surface away therefrom to permit the shoe to be presented to said upper-engaging means and toward the tack-receiving surface to locate said guides in operative relation to the shoe after the upper has been pulled.

74. A machine of the class described having means for gripping and pulling an upper at opposite sides of a last and means permitting adjustment of the last and upper relatively to position the last in relation to the lines of the upper, combined with means for lasting the forward portion of the shoe.

75. A machine of the class described having, in combination, means for gripping and pulling an upper at opposite sides of a last, means whereby the last and the upper may be relatively adjusted after the upper is pulled, and means for lasting the upper at the forward portion of the shoe all while the shoe remains in substantially the same position.

76. A machine of the class described having, in combination, means for pulling an upper on a last, means for supporting the last arranged to permit the last to be shifted in the upper for varying its position with relation to the lines of the upper, and means for forcing the upper into lasted position about the forward portion of the last.

77. A machine of the class described having, in combination, means for pulling an upper on a last, means for supporting the last arranged to permit the last to be shifted in the upper for varying its position with relation to the lines of the upper, means for forcing the upper into lasted position about the forward portion of the last, and means for inserting tacks.

78. A machine of the class described having, in combination, means for engaging an upper, means for engaging a last, means for relatively actuating said two engaging means to pull the upper, said machine being constructed and arranged to permit the last to be moved for adjusting it in the pulled upper, means for lasting the upper over the forward portion of an innersole on the last bottom, and means for inserting tacks through the upper into the innersole.

79. A machine of the class described having, in combination, grippers formed to receive at the sides and end of the shoe the flaring edge of the forward portion of the upper loosely applied to a last, means for engaging the last, means for relatively actuating said two means to pull the upper, and means for forcing the said edge portion of the upper over the last bottom.

80. A machine of the class described having, in combination, grippers formed with outwardly inclined jaws and located to receive at the sides and end of a shoe the flaring edge of the forward portion of the upper loosely applied to a last, means for engaging the last, means for relatively actuating said two means to pull the upper, means for forcing the said edge portion of the upper over the last bottom, and means for inserting tacks to hold the upper.

81. A machine of the class described having, in combination, grippers for engaging the upper at opposite sides of the forward portion of the last and means for relatively moving the grippers and last to pull the upper perpendicularly to the last bottom, said machine being constructed and arranged to permit, for the purpose of relatively adjusting the last and upper, a movement of the last about a center located between the grippers while the upper is under strain.

82. A machine of the class described having, in combination, means for gripping an upper at opposite sides of the forward portion of the last, an abutment for the last bottom, and means for relatively moving the abutment and last substantially perpendicularly to the last bottom to pull the upper, said machine having provision for permitting, for the purpose of relative adjustment of the last and upper, turning movement of the last within the gripped upper about an axis extending londitudinally of the shoe while the upper is under strain.

83. In a machine of the class described, means for gripping an upper at opposite sides of the forward portion of a last, said gripping means comprising suitable supporting and operating mechanism and sectional gripper jaws formed to adapt them to the contour of the sides of the last.

84. In a machine of the class described, means for gripping an upper at the end and the opposite sides of the forward portion of a last, said gripping means comprising suitable supporting and operating mechanism and sectional gripper jaws formed to adapt them to the contour of the forward portion of the last.

85. In a machine of the class described, means constructed and arranged for substantially continuous gripping engagement with an upper from one side of a last around the toe end of the last to the other side, said gripping means comprising suitable supporting and operating mechanism and sectional gripper jaws having curved acting faces formed to adapt them to the contour of the sides and end portion of the last.

86. In a machine of the class described, means constructed and arranged for substantially continuous gripping engagement with an upper from one side of a last around the toe end of the last to the other side, said

gripping means comprising suitable supporting and operating mechanism and sectional gripper jaws having curved acting faces formed to adapt them to the contour of the sides and end portion of the last, said jaws being adjustably connected to the supporting and actuating mechanism.

87. In a machine of the class described, means for gripping an upper at opposite sides of the forward portion of a last, said gripping means comprising suitable supporting and operating mechanism, and sectional gripper jaws formed to adapt them to the contour of the sides of the last, said jaws being adjustably connected to the supporting and actuating mechanism.

88. In a machine of the class described, grippers constructed and arranged to engage the upper at the sides and end portion of a shoe, said grippers comprising cooperating curved jaws having a configuration corresponding to the normal, outwardly flaring position at the sides and toe end of the shoe of the edge portion of the forward part of an upper applied loosely to a last.

89. A machine of the class described having, in combination, means for working an upper over a last, tack-driving mechanism comprising a tack guide and a driver movably supported to allow it to be positioned away from the shoe during the overworking operation, and operating mechanism for moving the guide lengthwise of the driver toward the work and then actuating the driver to insert a tack.

90. A machine for working an upper over a last having means for securing the upper comprising a tack guide and a driver normally occupying a retracted position away from the shoe bottom to permit the overworking operations to take place, and means for actuating the guide and the driver perpendicularly to the tack-receiving surface to position and drive the tack.

91. A machine of the class described having, in combination, means for working an upper over a last, tack-driving mechanism comprising a tack guide and a driver movably supported to allow it to be positioned away from the shoe during the overworking operation, operating mechanism for moving the guide lengthwise of the driver toward the work and then actuating the driver to insert a tack, and means for automatically retracting the tack guide.

92. A machine of the class described having, in combination, means for working an upper over a last, tack-driving mechanism comprising a tack guide and a driver movably supported to allow it to be positioned away from the shoe during the overworking operation, operating mechanism for moving the guide lengthwise of the driver toward the work and then actuating the driver to insert a tack, means for setting the driver, and means for retracting the tack guide automatically when the driver is set.

93. A machine of the class described having, in combination, means for working an upper over a last, fastening mechanism comprising drivers for inserting tacks simultaneously at opposite sides of the shoe, separate springs for actuating said drivers, and a single manually operated mechanism for setting the several driver springs.

94. A machine of the class described having, in combination, a single grippers mechanism constructed and arranged to receive the upper at the end and the opposite sides of the forward portion of a shoe and comprising a plurality of jaw sections presenting a substantially continuous gripping face for engaging each side of the upper, and which are supported for relative movement to adapt the grippers to shoes of different widths.

95. A machine of the class described having, in combination, grippers curved to receive the upper at the forward portion of a shoe and comprising a plurality of jaws for engaging each side of the upper, and means for adjusting the jaws to adapt the grippers to shoes of different shapes.

96. A machine of the class described having, in combination, grippers to receive the upper at the forward portion of a shoe and comprising a plurality of jaws curved from substantially the middle of the toe backwardly for engaging each side of the upper, and means for independently adjusting the jaws at the two sides of the shoe to adapt them to differences in the contours of crooked lasts.

97. A machine of the class described having, in combination, grippers constructed and arranged to receive the upper at the forward portion of a shoe and comprising a plurality of curved jaws for engaging each side of the upper, which are supported for independent movement of the jaws at the opposite sides of the shoe in directions to adapt the contour of the grippers to the shapes of different lasts.

98. A machine of the class described having, in combination, grippers constructed and arranged to receive the upper at the forward portion of a shoe and comprising a plurality of jaws for engaging each side of the upper and together forming a substantially continuous gripping member, said jaws being mounted for relative movement to adapt them to the contour of the forward portion of the shoe to be operated upon.

99. A machine of the class described having, in combination, grippers to receive the upper at the forward portion of a shoe and comprising a plurality of curved jaws for engaging each side of the upper and together form a substantially continuous gripping member, said jaws being mounted for

relative movement to adapt them to the contour of the forward portion of the shoe to be operated upon, and means conveniently accessible to the operator for adjusting the jaws.

100. A machine of the class described having, in combination, curved grippers to receive the upper at the forward portion of a shoe and comprising a plurality of jaws for engaging each side of the upper, means for adjusting the jaws to adapt the grippers to shoes of different shapes, and means for locking the jaws.

101. A machine of the class described having, in combination, grippers having curved gripping edges formed in sections, and adjusting means for varying the contour presented by the gripping edges.

102. A machine of the class described having, in combination, grippers having curved sectional jaws to grip the upper at the end and the two sides of the toe portion of the shoe, and means for adjusting the sectional jaws at the two sides of the shoe about a single center.

103. A machine of the class described having, in combination, grippers having curved sectional jaws presenting substantially continuous gripping edges to grip an extended section of upper and mounted for angular movement to adapt the gripping edges to the contour of the portion of the shoe over which the upper is to be pulled by the grippers.

104. A machine of the class described having, in combination, grippers having curved jaws, and means for adjusting said jaws to vary the curvature.

105. A machine of the class described having, in combination, grippers having curved jaws with toothed outer faces, an adjusting device engaging said toothed faces, and means for effecting adjustment of said jaws through said device.

106. A machine of the class described having, in combination, grippers having curved jaws 40, 41, shafts 72 having operative engagement with the jaws, and locking devices 74.

107. A machine of the class described having, in combination, grippers having curved jaws, supports for the jaws with which the latter have pin and curved slot connection, means for adjusting said jaws in directions determined by said curved slots, and provision for locking the jaws.

108. A machine of the class described having, in combination, lasting devices shaped in substantial similarity to the edge contour of the forward portion of a shoe and formed in relatively movable sections, and means for angularly adjusting the sections of the lasting devices relatively for contours of shoes of different width or shape, said machine having provision for locking the lasting devices to maintain the adjustment.

109. A machine of the class described having, in combination, lasting devices shaped in substantial similarity to the edge contour of an end portion of a shoe and formed in relatively movable sections presenting a continuous operative edge, and means to move the sections independently for initially adjusting them to adapt the operative edge to variations in the shape of different shoes.

110. A machine of the class described, comprising means for gripping an upper at opposite sides of the forward portion of the last, and means for relatively moving the grippers and last to pull the upper, said machine having provision for permitting movement of the last sidewise relatively to the gripped upper.

111. A machine of the class described, comprising means for gripping an upper at opposite sides of the forward portion of the last, and means for relatively moving the grippers and last to pull the upper, said machine having provision for permitting movement of the last about a center in the forward portion of the last to adjust the last and upper relatively.

112. A machine of the class described, comprising means for gripping an upper at opposite sides of the forward portion of the last, and means for relatively moving the grippers and last to pull the upper, said machine including an abutment for the bottom of the last about which the last may be turned to adjust the last and upper relatively.

113. A machine of the class described, comprising means for gripping an upper at opposite sides of the forward portion of a last, and means for relatively moving the gripping means and last to pull the upper, said machine having provision for permitting turning movement of the last relatively to the gripped upper about an axis extending longitudinally of the shoe.

114. A machine of the class described, comprising means for gripping an upper at opposite sides of the forward portion of the last, and means for relatively moving the grippers and last to pull the upper, said machine having provision for permitting movement of the last relatively to the gripped upper about an axis extending transversely across the last bottom.

115. A machine of the class described having, in combination, end-lasting plates or wipers presenting a continuous acting edge to extend around a last end and arranged to turn about a single pivotal point, means for actuating said plates, and means for adjusting the plates with relation to their actuating mechanism.

116. A machine of the class described hav-

ing, in combination, end-lasting plates or wipers shaped to adapt them to the contour of the end portion of a last and arranged to turn about a common axis, and means for actuating said plates, said machine having provision for effecting relative adjusting movement of the plates that act at opposite sides of the shoe to adapt them to lasts of different shapes.

117. A machine of the class described having, in combination, end-lasting plates or wipers shaped to adapt them to the contour of the end portion of a last and mounted to turn about a common pivotal point or axis, means for actuating said plates, and means for independently adjusting the plates that act at the opposite sides of the shoe.

118. A machine of the class described having, in combination, end-lasting wipers, plates for supporting the wipers, pin and curved slot connections between the wipers and plates, means for adjusting the wipers on the plates, and independent means for actuating the wipers to force the upper over the end and sides of the last.

119. A machine of the class described having, in combination, end-lasting wipers arranged to embrace an end portion of a last and to turn about a common pivotal point, plates for supporting the wipers, adjustable connections between the plates and wipers whereby the plates can be positioned for lasts of different contours, means for adjusting the wipers, and means for actuating the wipers.

120. A machine of the class described having, in combination, a last rest and lasting plates or wipers operatively connected for movement together in the same direction toward and from operative position.

121. A machine of the class described having, in combination, wipers for forcing an upper over the end portion of a last, a rest for the last, and manually controlled means for actuating the rest and the wipers together in the same direction.

122. A machine of the class described having, in combination, toe wipers, a toe rest, and connected mechanism for moving the rest in substantially the plane of its shoe resting face toward the shoe when the wipers are advanced over the shoe bottom.

123. A machine of the class described having, in combination, a toe rest adapted to occupy a position out of touch with the shoe, wipers for working the upper over the last, and connected mechanism for moving the rest into operative relation to the shoe when the wipers are advanced.

124. A machine of the class described having, in combination, a toe rest adapted to occupy a position out of touch with the shoe, means for moving the rest into operative relation to the shoe, and other manually controlled means for actuating the rest perpendicularly to the shoe bottom.

125. A machine of the class described having, in combination, means for supporting a shoe in an upright position, wipers arranged for movement downwardly to work the upper over the last, a toe rest movable downwardly into position in front of the shoe, and means for actuating the rest to force the shoe backward against the wipers.

126. A machine of the class described having, in combination, a toe rest having a bent shank by which it is swung from and toward operative position, a pinion keyed to the shank, and a rack for engaging the pinion to swing the rest, a worm formed on the shank, a sprocket wheel mounted on the worm, and a chain on the sprocket wheel to move the shank endwise for actuating the rest from and toward the shoe.

127. A machine of the class described having, in combination, means for working an upper over a last, and means for securing the upper comprising a tack tube and a driver for inserting an anchor tack and means carried by the tack tube to hold a binder in position to cause the tack to anchor the binder to the shoe.

128. A machine of the class described having, in combination, means for working an upper over a last, and means for securing the upper comprising a tack tube and a driver for inserting an anchor tack, and means carried by the tube for holding the binder at two points and positioning an intermediate portion of the binder in the path of the tack whereby the binder is anchored at one end to the shoe.

129. A machine of the class described having, in combination, grippers comprising a stationary jaw mounted on a rigid frame and a movable jaw, and a wiper movable between an unyielding portion of said frame and said stationary jaw and supported by the latter.

130. A machine of the class described having, in combination, grippers comprising a stationary jaw mounted on a rigid frame and a wiper movable between an unyielding portion of the frame and said stationary jaw for working the upper over the last bottom, and means for pressing the last against the wiper, said stationary jaw serving to brace the wiper against the last during said pressure.

131. Means for gripping substantially the entire forward portion of the upper at its edge from one side around the toe to the other side and pulling said forward portion of the upper, and means having a substantially continuous wiping edge for forcing said forward portion of the upper over the last bottom into lasted position.

132. A machine of the class described,

having, in combination, means for gripping substantially the entire forward portion of the upper at its edge from one side around the toe to the other side and pulling said forward portion of the upper, wipers having a substantially continuous wiping edge for forcing said forward portion of the upper over the last bottom into lasted position, and means for relatively moving the last and wipers perpendicularly to the last bottom for conforming the upper between the wipers and the last.

133. A machine of the class described, having, in combination, means for gripping substantially the entire forward portion of the upper at its edge from one side around the toe to the other side and pulling said forward portion of the upper away from the side faces of the last, and means having a substantially continuous working edge for forcing the upper into lasted position and molding the upper upon the last bottom.

134. A machine of the class described having, in combination, means for working an upper over a last, and means for fastening the upper comprising tack holders movable substantially perpendicularly to the last bottom from a position out of the way of the overworking means into a position adjacent to the surface of the shoe bottom.

135. A machine of the class described having, in combination, means for working an upper over a last, mechanism for driving tacks at opposite sides of the shoe simultaneously, means for actuating said tack driving mechanism bodily perpendicularly to the shoe bottom from and toward driving position, and means for adjusting said mechanism transversely of the shoe for shoes of different widths.

136. A machine of the class described having, in combination, means for working an upper over a last, means for fastening the upper comprising tack holders movable substantially perpendicularly to the last bottom from a position out of the way of the overworking means into a position adjacent to the surface of the shoe bottom, tack drivers, and means for moving the tack holders into operative position.

137. A machine of the class described having, in combination, means for working an upper over a last, means for fastening the upper comprising tack holders movable substantially perpendicularly to the last bottom into a position adjacent to the surface of the shoe bottom, and means for actuating the drivers to insert the tacks, the insertion of the tacks following the positioning of the tack holders automatically.

138. A machine of the class described having, in combination, means structurally independent of the overworking means for working an upper over a last, means for inserting fastenings to secure the upper at opposite sides of the shoe, and manually operated means for adjusting the inserting mechanisms from and toward the median plane of the shoe for adapting them to shoes of different widths.

139. A machine of the class described having, in combination, means for gripping an upper at opposite sides of a last and means for supporting the last relatively arranged to pull the upper and to permit adjustment of the pulled upper and the last relatively, said machine having provision for permitting the tension on the upper to be relaxed during the adjusting operation.

140. A machine of the class described having, in combination, means for pulling an upper at a plurality of points, means for wiping the pulled upper into lasted position upon the last bottom, and means for supporting the last having provision for permitting the last to be tipped laterally and longitudinally to position its bottom face in the plane of the wipers.

141. A machine of the class described having, in combination, connected wipers for forcing the upper into lasted position about the toe portion of a last, and clamps yieldingly mounted upon the wipers and arranged to engage the upper in advance of the wipers to hold it against the side of the last while the wipers force its marginal portion over the last bottom.

142. A machine of the class described having, in combination, means for pulling an upper on a last at the toe and at opposite sides of the last, toe-lasting wipers for forcing the pulled upper over the edge of the last, and clamps moving with the wipers and arranged to clamp the upper against the sides of the last in advance of the action of the wipers.

143. A machine of the class described having, in combination, means for pulling an upper on a last at the toe and at opposite sides of the last, toe-lasting wipers adapted to pull the edge of the upper from the grippers and force it into lasted position, and clamps yieldingly carried by the wipers at the opposite sides of the last to bind the upper against the side of the last before the wipers pull it from the grippers.

144. A machine of the class described having, in combination, means for pulling an upper on a last at the toe and at opposite sides of the last, toe-lasting wipers, and means for inserting tacks to fasten the upper at the sides of the shoe, including a tack at each side adapted to anchor a binder extending around the toe of the shoe.

145. A machine of the class described having, in combination, means for pulling an upper on a last at the toe and at opposite sides of the ball of the last, toe-lasting wipers, and clamps occupying an inoperative position during the pulling operation

and adapted to engage and force the upper against the last at the top face and at the opposite sides of the ball before the wipers force the upper over into lasted position.

146. A machine of the class described having, in combination, wipers for forcing an upper into lasted position over a last bottom and clamps operatively connected with the wipers and arranged for movement into holding engagement with the shoe in advance of the wipers.

147. A machine of the class described having, in combination, wipers for forcing an upper into lasted position over a last bottom, and a clamp operatively connected with the wipers and arranged for movement thereby from a position out of engagement with the last into binding engagement with the top face of the last.

148. A machine of the class described having, in combination, end-lasting wipers, an actuator therefor, a toe clamp 100, and lost motion connections from the clamp to said actuator whereby the wipers and clamp are first actuated together and then the wipers may be further actuated.

149. A machine of the class described having, in combination, means for supporting a shoe in position to present an unobstructed view to the operator, means for pulling over the shoe, said machine having provision for relative adjustments of the pulling means and the last to position the last and upper, a clamp for engaging the top face of the last over the ball to prevent the upper from bridging between the instep and the toe, means for moving the clamp from an inoperative position at one side of the shoe laterally toward operative position and means for moving the clamp into holding engagement with the shoe.

150. A machine of the class described having, in combination, a toe rest movable laterally with relation to the plane of the last bottom from and toward operative position, and means for actuating the rest perpendicularly to said plane to force it against the top face of the last.

151. A machine of the class described having, in combination, means for supporting a shoe in upright position, and grippers for pulling the upper constructed with substantially continuous gripping faces arranged to receive the marginal edge of the upper at the end and opposite sides of the shoe, said machine being arranged to present to the operator standing in working position a substantially unobstructed view of the top face of the shoe.

152. A machine for working an upper over a last having, in combination, grippers constructed and arranged to engage the upper at the end and at opposite sides of the last, and an abutment for the last bottom having a smooth acting face upon which the last may be moved for adjusting it with relation to the gripped upper to position the upper and last relatively.

153. A machine for working an upper over a last having, in combination, grippers constructed and arranged to engage the upper at the end and at opposite sides of the last, an abutment engaging the bottom of the last, and means for relatively moving the grippers and last to put the upper under tension, said parts being constructed and arranged to permit movement of the last upon the abutment for relatively adjusting the last within the upper.

154. A machine of the class described having, in combination, means for engaging an upper at the opposite sides and the toe end of a last, means for supporting and positioning the last, and mechanism for relatively actuating said two means to pull the upper, said parts being constructed and arranged to permit the last to be adjusted within the upper for relatively positioning the upper and the last longitudinally and transversely of the shoe.

155. A machine of the class described having, in combination, grippers having curved gripping edges formed in sections and relatively adjustable to vary the contour presented by their gripping edges, and means for actuating the grippers.

156. A machine of the class described having, in combination, grippers having curved sectional jaws to grip the upper at the end and the two sides of the toe portion of the shoe, said jaws being adjustable for toe portions of different shapes, and means for actuating the grippers.

157. A machine of the class described having, in combination, grippers having curved sectional jaws to grip the upper at the end and the two sides of the toe portion of the shoe, said machine having provision for independent adjustment of the jaws at the two sides of the shoe to adapt them for right and left crooked lasts, and means for actuating the grippers.

158. A machine of the class described having, in combination, grippers provided with substantially continuous gripping edges curved to grip the upper at the two sides and the toe end of the shoe and adjustable for shoes of different shapes, and means for actuating the grippers.

159. A machine of the class described having, in combination, grippers having curved jaws relatively adjustable, and means for actuating the jaws to grip and pull an upper.

160. In a machine of the class described, means for pulling an upper comprising grippers having curved gripping faces formed in sections and relatively adjustable to adapt them to shoes of different shapes.

161. A machine of the class described hav-

ing, in combination, means for gripping an upper at the two opposite sides of the forepart of a last and pulling it over the last, said means being constructed and arranged to permit the last to be moved relatively to the grippers to adjust the upper about the last.

162. A pulling-over machine having, in combination, means for gripping an upper, means for supporting a last, and means for actuating the gripping means and the last to straighten the upper over the last under a light tension, said machine having provision for permitting relative adjusting movements of the upper and last to correct the position of the upper and provision for causing said actuating means to effect further relative movement of the upper and the last to stretch the upper after it has been adjusted.

163. A pulling-over machine having, in combination, means for gripping an upper, means for supporting a last, and actuating means adapted for operation to cause the upper to be seized and straightened over the last, and then to hold the upper under a light tension while the last and upper are relatively adjusted to correct the position of the upper, and for further operation to cause said actuating means to effect stretching of the upper snugly over the last.

164. A pulling-over machine having, in combination, means for gripping an upper, means for supporting a last, and actuating means adapted for operation to cause the upper to be seized and straightened over the last, and then to hold the upper under a ligt tension while the last and upper are relatively adjusted to correct the position of the upper, and for further operation to stretch the upper snugly over the last, together with means for forcing the upper into lasted position.

165. A machine of the class described having, in combination, last engaging means, means for gripping an upper at the end and opposite sides of the forward portion of a shoe and means for relatively actuating the last engaging means and the upper gripping means to put the upper under tension over the last, said machine being constructed and arranged to permit relative lateral movement of the last and the gripping means to be effected for straining of the upper at the toe end of the shoe laterally.

166. A machine of the class described having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of a shoe, said means being mounted in the machine to restrain it from loose sidewise movement, and means for relatively actuating the last and the grippers to pull the upper, said machine having provision for a relative movement of a gripper and the last transversely of the machine while the upper is under tension.

167. A machine of the class described having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of a shoe to pull the upper about a last, and last resting means, one of said two means being mounted for sliding movement transversely of the machine after the upper has been pulled.

168. A machine of the class described having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of a shoe to pull the upper about a last, last resting means, and a guide in which one of said means is arranged for lateral, sliding adjustment transversely of the machine.

169. A machine of the class described having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of a shoe to pull the upper about a last, last resting means and position controlling means for one of said first two means by which the pulling means and the last may be laterally adjusted relatively before and after the upper has been put under tension.

170. A machine of the class described having, in combination, grippers curved to receive the upper at the end and sides of the forward portion of the shoe and formed with two lateral sections which are relatively movable to adapt the grippers to receive the uppers of shoes of different widths.

171. A machine of the class described having, in combination, grippers curved to receive the upper at the end and sides of the forward portion of the shoe and formed in two sections relatively movable about a center substantially at the middle of their edge for adaptation to the shape of the last.

172. A machine of the class described having, in combination, means for working an upper over a last, including upper pulling and overlaying devices, and tack driving devices which are mounted to permit movement transversely of the shoe bottom into place to insert tacks at the desired distance from the edge of the shoe, and are movable bodily toward the plane of the last bottom from a remote position into tack inserting relation to the overlaid upper.

173. A pulling-over machine having, in combination, upper gripping and pulling devices, actuating mechanism for causing said devices to lay the upper over the opposite sides of the last bottom in position to be fastened, and tacking mechanism cooperating therewith and including tack and driver guides which are movable perpendicular to the plane of the shoe bottom into position to clamp the upper against the shoe bottom before the tack is driven.

174. A machine for preparing a shoe for the

operation of fastening the upper to the sole on the last bottom, having, in combination, a toe rest adapted to occupy a position in which it permits an unobstructed view of the shoe, means for working the upper over the last and connected mechanism for moving the rest into operative engagement with the shoe and advancing the overworking means.

175. A machine for preparing a shoe for a subsequent operation on the shoe bottom having, in combination, a rest for the heel portion of the shoe, a rest for the toe portion of the shoe which is mounted for movement from and toward shoe engaging position, means movable lengthwise of the shoe for preparing the shoe for such further operation and connected mechanism for actuating said toe rest and said means simultaneously.

176. A machine of the class described having, in combination, gripper jaws curved to engage an upper at the end and opposite sides of the toe portion of a last, each jaw being formed in relatively movable sections, opposed jaw sections being adjustable together.

177. A machine of the class described having, in combination, gripper jaws curved to engage an upper at the end and opposite sides of the toe portion of a last, each jaw being formed in relatively movable sections, and means for adjusting pairs of opposed jaw sections together and independently of other pairs.

178. A machine of the class described having, in combination, wipers; means for actuating the wipers to advance and close over the toe of a shoe; and means independent of the wipers for engaging and holding the marginal edge of the upper at the end and for a substantial distance along the sides of the toe outwardly flared while the wipers advance.

179. A machine of the class described having, in combination, end embracing wipers and means for advancing and closing them to lay an upper over the end and sides of the toe portion of a last bottom; and gripping means relatively to which the wipers are closed and over which the upper may be spread out and gripped at the sides of the toe for holding those portions of the upper against the closing movement of the wipers.

180. In a lasting machine the combination with toe embracing wipers; of actuating means to advance the wipers over the end and close them over the sides of the toe; and means relatively to which the wipers have closing movement, said means including a member which is arranged with relation to the wipers to permit the upper at the sides of the toe to be outspread thereover and a coöperating member for gripping said outspread side portion of the upper.

181. A lasting machine having, in combination, means for holding the marginal edge of the sides and toe portion of an upper outspread from the last, members for holding the shoe between the sole and the opposed face of the shoe, means for effecting relative movement of the last and the upper holding means to stretch the upper, toe embracing wipers separate from the upper holding means, and means for actuating said wipers to advance over the end and close over the sides of the toe while the edge of the upper is maintained outspread in unwrinkled condition by said upper holding means.

182. A machine for working an upper over a last having, in combination, a plate over which the marginal portion of an upper can be outspread at the end and sides of the toe, means to grip the upper against said plate, a last bottom abutment, means relatively actuating the abutment and the upper gripping means to pull the toe portion of the upper, end embracing wipers, means for advancing the wipers and closing them over the sides of the toe to lay the upper in lasted position upon the shoe innersole, said upper gripping means being arranged and operated to hold the upper outspread during the overlaying movement of the wipers and to allow the upper to be pulled therefrom under tension by the wipers at the sides as well as at the end of the toe, and a toe rest between which and the wipers the upper can be compressed in overlaid position.

183. A machine of the class described having, in combination, end embracing wipers, and means for advancing and closing them to lay an upper over the end and sides of the toe portion of a last bottom; and coöperating gripping members substantially co-extensive with the acting edge of the wipers and between which the margin of the upper adjacent to the tip seam is spread outwardly and held away from the edge of the last bottom during the closing movement of the wipers.

184. In a lasting machine the combination with toe embracing wipers, actuating means to advance the wipers over the end and close them over the sides of the toe, and means independent of the wipers and arranged near the end portions of the wipers which work at the sides of the toe to receive and hold outturned edge portions of the upper while the wipers close between the last bottom and said holding means.

185. A machine for working an upper over a last having in combination, end embracing wipers and means for advancing and closing them to lay the upper over the

last bottom at the end and sides of the toe; and upper holding means comprising a jaw having a curved inner edge substantially co-extensive with the edge of the wipers and constructed and arranged to receive the upper in outspread condition, and coöperating means to grip the upper and hold it frictionally on said jaw against the closing action of the wipers.

186. A machine for working an upper over a last having, in combination, end embracing wipers and means for advancing and closing them to lay the upper over the last bottom; and upper holding means comprising coöperating members which do not participate in the closing movement of the wipers and between which the upper at the end and also the sides of the toe portion of the shoe can be spread out and gripped to hold it from wrinkling during the wiper closing movement.

187. A machine of the class described having, in combination, toe embracing wipers, and means for advancing the wipers and closing them inwardly over the last bottom from opposite sides of the toe to lay the upper into lasted position; and upper gripping means relatively to which the wipers are movable and which is arranged to hold the upper outspread at the sides of the toe while the wipers advance and close to overlay the upper.

188. A machine of the class described having, in combination, end embracing wipers, and means for advancing and closing them to lay an upper over the end and sides of the toe portion of a last bottom, a plate substantially co-extensive with the wipers and relatively to which the wipers are closed and over which the upper may be spread outwardly, and means coöperating with said plate and constructed and arranged to grip the marginal edge of the upper against said plate and hold it away from the edge of the last bottom at the end of the toe and at the sides adjacent to the tip seam during the closing of the wipers.

189. A machine of the class described having, in combination, end embracing wipers, and means for advancing and closing them to lay an upper over the end and sides of the toe portion of a last bottom; a plate substantially co-extensive with the wipers, and means for gripping the upper thereto at the toe and at points adjacent to the ends of the wipers and holding those portions of the upper during the wiper closing movement.

190. A machine for working an upper over a last having, in combination, end embracing wipers and means for advancing and closing them to lay the upper over the last bottom; upper holding means comprising a member separate from the wipers over which the upper can be spread outwardly, at the end and for a substantial distance along the sides of the toe portion of the shoe, and a coöperating member to grip the upper and hold it against the first mentioned member in outspread condition at said points during the closing action of the wipers, and means for relatively actuating the last and said upper holding means substantially perpendicularly to the plane of the last bottom to pull the upper before it is overlaid by the wipers.

191. A machine of the class described having, in combination, wipers; means for actuating the wipers to advance and close over the toe of a shoe; and means independent of the wipers and including coöperating members substantially co-extensive with the wiper edges between which the upper can be spread outwardly away from the last edge and held in smooth unwrinkled condition from one side of the toe around to the opposite side of the toe while the wipers advance and close between the holding means and the last bottom to lay the upper over the last edge.

192. A machine of the class described having, in combination, end embracing wipers, and means for advancing and closing them to lay an upper over the end and sides of the toe portion of a last bottom, a plate having a formed edge made in two lateral sections relatively adjustable for shoes of different width and presenting an edge substantially co-extensive with the wipers, and means for holding the upper to said plate.

193. A machine of the class described having, in combination, wipers, means for actuating the wipers to advance and close over the toe of the shoe, and means for holding the marginal edge of the upper at the end of the toe outspread independently of the wipers and for holding the edge of the upper at the sides of the toe near the tip seam outspread while the wipers advance.

194. A machine of the class described having, in combination, wipers; mechanism for actuating the wipers to advance and close over the toe of a shoe; and means independent of the wipers for holding the marginal edge of the upper at the end and sides of the toe outspread while the wipers advance, said means having provision for adjustment to adapt it to hold the upper at the sides of wide and narrow shoes.

195. A machine of the class described having, in combination, wipers; mechanism for actuating the wipers to advance and close over the toe of a shoe; and means for holding the marginal edge of the upper at the end and sides of the toe outspread while the wipers advance, said means being arranged for adjustment of opposite side portions relatively to the median line of the machine for right and left crooked shoes.

196. A machine of the class described having, in combination, end lasting wipers, plates for supporting and actuating the

ipers, means to effect adjusting movements
f the wipers independently of the plates,
d means for actuating the plates.

197. A machine of the class described hav-
g, in combination, toe embracing wipers,
d means for actuating them to lay an up-
r over the toe portion of a last bottom, a
ate over which the upper may be spread,
id plate being formed in sections which
e relative! adjustable to adapt the plate
toes of different widths, and means for
lding the upper on said plate.

198. A machine of the class described hav-
g, in combination, toe embracing wipers,
ans for actuating the wipers and means
r engaging and frictionally holding the
per at the two sides of the toe adjacent to
e tip seam while the wipers are actuated,
id holding means being former in sections
hich are adjustable laterally for shoes of
fferent widths or shapes.

199. A machine of the class described hav-
g, in combination, toe embracing wipers
r engaging the outer side of the upper ma-
rials and means for actuating said wipers
lay the upper over the toe portion of a
st bottom, and means to engage the inner
le of the upper materials, said means com-
ising two lateral sections and a support
erefor relatively to which an adjustment
the sections can be maintained for oper-
ing with a series of toes of similar width
shape.

200. A machine of the class described hav-
g, in combination, toe embracing wipers
tending on each side of the toe substan-
lly to the tip seam, and means for actu-
ing the wipers; and upper holding means
operating with the end portions of the
pers to effect tensioning of the upper adja-
nt to the tip seam when the wipers are
erated, said machine having provision for
lative lateral adjustment of sections of the
per holding means at the two sides of the
oe for toes of different widths.

201. A machine of the class described hav-
g, in combination, toe embracing wipers
tending on each side of the toe substan-
lly to the tip seam, means for actuating
e wipers; and upper holding means co-
erating with the end portions of the
pers to effect tensioning of the upper ad-
cent to the tip seam when the wipers are
erated.

202. In a machine for working an upper
er a last, wipers, mechanism for advancing
e wipers to force the upper over the edge
the last into lasted position, means lo-
ted on the side of the wipers opposite the
oe for engaging a substantially continuous
rtion of the upper extending around the
rved portion of the toe of the shoe and
pplying tension to the upper while the
pers are advancing to lay the upper over
the last, said means being adjustable for different widths of toes.

203. A machine for working an upper over a last having, in combination, means for gripping an upper at opposite sides of the forward portion of the last, and means including an abutment for the last for relatively moving the gripping means and last to pull the upper, said machine having provision for permitting turning movement of the last within the gripped upper about an axis extending longitudinally of the shoe.

204. A machine of the class described having, in combination, grippers constructed and arranged to have substantially continuous engagement with the upper from one side around the toe to the other side, an abutment engaging the last bottom between the toe and the rear ends of the grippers, and means for relatively actuating the grippers and the abutment to put the upper under tension, said machine having provision for movement of the last about the abutment to vary the relative tension on the upper at the toe and sides of the shoe.

205. A machine of the class described, comprising means presenting substantially continuous gripping surfaces for gripping an upper at the toe end and opposite sides of the fore part of the last, means for relatively moving the grippers and last to pull the upper, a heel rest movable into position for engaging the heel of the shoe, and means to actuate the heel rest to force the last longitudinally into the upper.

206. A machine of the class described, comprising means for engaging the upper, means for engaging the last, and means for relatively actuating said two engaging means to pull the upper about the last, said machine being constructed and arranged to permit the last to be adjusted in the pulled upper for positioning it with relation to the lines of the upper in a direction other than lengthwise of the last.

207. In a machine of the class described, the combination with grippers having a configuration corresponding to the outwardly flaring edge portion of upper material at the fore part of a last, of means for closing the grippers, means for relatively moving the last and grippers substantially perpendicularly to the last bottom to stretch the upper, wipers constructed and arranged to embrace the fore part of the shoe, and means to actuate the wipers for laying the upper over the last-bottom.

208. In a machine of the class described, the combination with grippers having a configuration corresponding to the outwardly flaring edge portion of upper material at the fore part of a last and provided with sectional jaws having gripping faces extending obliquely with relation to the side face of

the last, of means for closing the grippers, means for relatively moving the last and grippers substantially perpendicularly to the last bottom to stretch the upper, and means for laying the upper over the last bottom.

209. In a machine for working an upper over a last, the combination with grippers and actuating mechanism therefor, of means for moving the last away from the grippers to stretch the upper, wipers presenting a substantially continuous acting face for laying the upper over the bottom of the last at the end and opposite sides of the toe portion of the last, and a rest movable relatively to the wipers into and out of position to support the last against the pressure of the wipers.

210. In a machine for working an upper over a last, in which the last is positioned with its toe end uppermost, the combination with means for pulling the upper over the toe portion of the last, and wipers for laying the upper over the last bottom, of a toe rest adapted to engage a top face of the shoe and movable relatively to the wipers and against the shoe in a direction for pressing the shoe rearwardly toward the wipers.

211. In a machine of the class described, the combination with mechanisms for working an upper over a last, of tack-inserting mechanisms having provision for automatically feeding tacks, and manually operated means for inserting the tacks simultaneously at opposite sides of the last.

212. A machine of the class described having, in combination, means constructed and arranged for substantially continuous gripping engagement with an upper from one side of the last around the toe end of the last to the other side, said gripping means comprising suitable supporting and operating mechanism and sectional gripper jaws each having a curved acting face.

213. A pulling-over machine having, in combination, means for resting a last, toe pulling-over means arranged to engage the upper at each side of the center of the tip of the toe, said means being constructed to shape to the curvature of the toe of the last the entire marginal portion of the upper where held by said pulling-over means, said machine having provision for relative lateral movement of said toe pulling-over means and the adjacent portion of the last.

214. A pulling-over machine having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of the shoe, means for relatively actuating the grippers and the last to pull the upper, and a heel rest mounted for lateral movement while in shoe resting position whereby the last may be shifted laterally with relation to the grippers.

215. A pulling-over machine having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of the shoe, an abutment for the forward portion of the last arranged to permit the last to be moved laterally with relation to the grippers, means for relatively moving the abutment and the grippers for pulling the upper, and a rest for the heel of the last mounted for lateral movement while in shoe resting position to facilitate the lateral movement of the shoe on the abutment.

216. A pulling-over machine having, in combination, grippers for engaging the upper at the end and sides of the forward portion of the last, an abutment for the last bottom for forcing the pulled upper into lasted position, a heel rest mounted for movement laterally of the shoe while it is resting the shoe, and means for actuating the heel rest longitudinally of the shoe.

217. A pulling-over machine comprising means for engaging a last, grippers for engaging the upper at the end and the sides of the toe, means for relatively actuating said engaging means to pull the upper, said machine having provision for a dwell in the pulling-over operation during which may be effected angular movement of the last in the shoe to position the tip seam of the upper relatively to the median line of the last, and means to fasten the upper upon the last.

218. A pulling-over machine comprising shoe supporting means, pulling-over means, means arranged for movement, after the upper has been pulled, into and out of contact with the top face of the shoe in the region of the tip seam, and means adapted for moving the last lengthwise relatively to said last mentioned means.

219. A pulling-over machine having, in combination, means for gripping an upper at the end and opposite sides of the forward portion of a shoe, means for relatively actuating the grippers and the last to pull the upper, a heel rest mounted for lateral movement while in heel resting position, and means for actuating the heel rest longitudinally of the shoe.

220. A pulling-over machine having, in combination, means for gripping an upper at the ends and sides of the forward portion of a shoe, an abutment for the forward portion of the last arranged to permit the last to be moved laterally with relation to the grippers, a rest for the heel of the last mounted for lateral movement while in shoe resting position, and means for actuating the heel rest longitudinally of the shoe.

221. A pulling-over machine comprising means for pulling the upper over the last, and securing means adapted for securing the pulled over upper to the insole, in combination with means to support the assembled shoe with its toe pointing in a direction of non-intersection with the plane of the front of the machine and with the tip line

in full view of the operative as he stands in working position at the machine.

222. In a machine of the class described, the combination with grippers constructed and arranged to grip an upper at the sides and toe of a last, of means for closing the grippers, means for relatively actuating the grippers and last to stretch the upper, means to wipe the upper over the bottom of the last into lasted position, and means for inserting fastenings through the upper and into an innersole on the last.

223. A machine of the class described, comprising grippers and actuating mechanism therefor, said grippers being constructed and arranged to have continuous engagement with the upper at the sides and end of the forepart of the last and to hold the upper out of contact with the sides of the last while the upper is pulled.

224. In a machine of the class described, the combination with grippers presenting substantially continuous gripping faces and constructed and arranged to engage the upper of the forepart of a shoe at the end and sides of the last and to pull the upper in lines oblique to the side faces of the last, of means for relatively moving the grippers and the last to stretch the upper, and means for laying the upper over the bottom of the last.

225. In a machine for working an upper over a last, the combination with grippers and actuating mechanism therefor, of means for moving the last away from the grippers to stretch the upper, wipers presenting a substantially continuous acting face for laying the upper over the bottom of the last at the end and opposite sides of the toe of the last, a rest movable relatively to the wipers into and out of position to support the last against the pressure of the wipers, and means for holding the rest in an inoperative position.

226. In a machine of the class described, the combination with grippers formed to receive simultaneously the outwardly flaring edge of the forepart of a shoe upper at the sides and end of the toe of the last, means for engaging the last, and means for relatively actuating said two means to pull the upper, of means for forcing the said edge portion of the upper over the last bottom, and mechanism for inserting tacks into the pulled upper and innersole.

227. In a machine of the class described, grippers constructed and arranged to engage the upper at the sides and end portion of a shoe, said grippers comprising coöperating jaws having a configuration adapting them to receive in its normal, outwardly flaring position at the sides and toe end of the shoe the forward part of an upper applied loosely to a last.

228. In a pulling-over and lasting machine, the combination with positioning means engaging a last, and upper pulling means, of operating mechanism for relatively actuating said two means to pull the upper, said machine being constructed and arranged to permit relative movement of said two means for adjusting the pulled upper about the last, and means adapted to work into finally lasted position a continuous section of the pulled and adjusted upper extending around the toe of the last.

229. In a machine of the class described, the combination with grippers for engaging an upper around the toe of the last, a rest for engaging the bottom of the last, and means for actuating the rest to sink the last into the upper, of means for working the upper into lasted position about the toe end of the last, said machine being constructed and arranged to permit movement of the grippers and the last to adjust the upper upon the last.

230. In a machine of the class described, the combination with means for pulling-over the upper and means for lasting the upper, of shoe supporting means occupying an inoperative position during the operation of the pulling-over means and movable into position to support the shoe during the operation of the lasting means.

231. In a machine of the class described, the combination with means for pulling an upper about the sides of a last, and means for changing the relative positions of the last and pulling means for causing the upper to be strained backwardly along the sides of the last, of lasting plates for forcing the upper of the forepart of a shoe inwardly from the sides of the toe and backwardly from the end of the toe into lasted position over the last bottom.

232. In a pulling-over and lasting machine, the combination with mechanism for pulling-over an upper loosely arranged upon a last including means permitting relative adjustment of the upper and the last for correctly positioning them after the upper has been pulled, of lasting mechanism for working the upper into lasted position after the operation of said pulling means and while the shoe remains in substantially the same position.

233. In a machine of the class described, the combination with means for pulling an upper simultaneously at opposite sides of a last, of means for moving the last and the pulling means relatively to strain the upper lengthwise of the last, and means for forcing the upper into lasted position all arranged to operate while the shoe remains in substantially the same position.

234. A machine of the class described having means for positioning a last, comprising a rest for the bottom of the last and a heel rest laterally movable to engage heels of

differently shaped lasts, combined with means for pulling an upper on the last, and means for forcing the upper into lasted position, said lasting means being mounted to receive in substantially the same lateral position the foreparts of differently shaped lasts.

235. A machine of the class described having, in combination, pulling-over means, toe lasting means operating to force over the last bottom a continuous section of upper extending from one side around the toe to the other side, and heel resting means self-adapting to the heel ends of right and left crooked lasts the foreparts of which are positioned similarly relatively to the lasting means.

236. In a machine of the class described, the combination with wipers and means for actuating the wipers to work an upper into lasted position about the toe portion of a last, of a presser constructed and arranged to occupy during the overworking operation of the wipers a position to permit an unobstructed view of the forepart of the upper by the workman, and means for actuating the presser to engage the forepart of the shoe and force it against the wipers.

237. In a pulling-over and lasting machine, the combination with pulling-over mechanism and lasting mechanism constructed and arranged to operate upon a shoe remaining in approximately the same position in the machine, of supporting and guiding means for the lasting mechanism arranged to permit the lasting mechanism to occupy during the operation of the pulling-over mechanism a position on the same side of the plane of the last bottom as the innersole to permit an unobstructed view of the shoe upper by the workman.

238. A pulling-over and lasting machine having, in combination, means for pulling-over a shoe, means for lasting the toe portion and the sides of the forward part of the shoe, and means for inserting securing tacks at the sides of the shoe including tacks located for anchoring a binder in position to hold the toe portion of the shoe in lasted relation to the innersole.

239. A machine for pulling-over shoes and lasting the foreparts of the shoes having, in combination, pulling-over means constructed and arranged to permit relative adjustment of the upper and last, means for lasting the shoe, means for resting the shoe, and supporting connections for said three means permitting adjustment of one of said means relatively to another one laterally of the shoe for adaptation to right and left crooked lasts.

240. A machine for pulling-over and lasting shoes having, in combination, means for gripping the forward portion of the upper and pulling it on the last, wipers, means for actuating the wipers to work into lasted position a continuous section of the upper extending around the toe, a heel rest to resist the backward thrust of the toe wipers, and supporting and guiding means for the grippers, wipers and heel rest permitting relative lateral positioning movement for right and left lasts.

241. A machine for use in the manufacture of boots and shoes having, in combination, means engaging the end and opposite sides of the toe portion of an upper for pulling over the shoe, means for working a continuous section of the pulled over upper extending around the toe into lasted position, and a heel rest, said pulling-over means and heel rest being relatively adjustable transversely of the machine for adaptation to right and left crooked lasts.

242. A machine for use in the manufacture of boots and shoes having, in combination, means for pulling an upper over a last arranged to permit relative adjustment of the last and the pulled upper transversely of the last, lasting means constructed and arranged for working the pulled over upper into lasted position about the toe portion of the last, and a heel rest between which and the overworking means there is relative movement for adaptation of the machine to right and left lasts presented to the pulling-over and the lasting means.

243. A machine for use in the manufacture of boots and shoes having, in combination, means for engaging the forepart of an upper and operating to pull the upper over a last, means for working the tensioned upper into lasted position over the forward portion of the last, said machine being constructed and arranged to permit relative adjustment of the last and the pulled upper longitudinally of the last between the pulling and the lasting operations, shoe rear part resting means, and mountings for said pulling-over means, overworking means and resting means permitting relative lateral movement of the means acting at the forepart of the shoe and the means acting at the rear part of the shoe for adaptation of said means to coöperate in working upon shoes being made on right and left crooked lasts.

244. A pulling-over and lasting machine having means for gripping and pulling an upper at opposite sides of the forepart of a last, and means for resting the forepart of the last against the action of the pulling-over means, said two means being arranged to permit adjustment of the last and upper relatively to position the last in relation to the lines of the upper, combined with means for lasting the forward portion of the shoe, and means for holding the rear part of the shoe for the lasting operation, said holding

means and said lasting means being relatively adjustable transversely of the shoe to adapt said means to coöperate in working upon shoes being made on right and left crooked lasts.

245. A pulling-over and lasting machine having, in combination, means for gripping and pulling an upper at opposite sides of a last, means whereby the last and the upper may be relatively adjusted after the upper is pulled, means for lasting the upper at the forward portion of the shoe, and a rest to resist the backward thrust of said lasting means, said rest being mounted for adjustment transversely of the machine for right and left lasts presented respectively with their foreparts in the required relation to the pulling-over and the lasting means.

246. A machine of the class described having, in combination, shoe positioning means adapted to present a shoe for lasting with its top face toward the operator and its sole face away from the operator, toe embracing wipers, and supporting and operating mechanisms for the wipers located on the same side of the plane of the top face of the shoe as is the bottom face of the shoe whereby a substantially unobstructed view of the top face of the shoe by the operator is permitted while the wipers are working the upper into lasted position.

247. A machine of the class described having, in combination, end embracing wipers and means for supporting and actuating said wipers to force upper materials over an innersole on the bottom face of a last, said supporting and actuating means being located on the same side of the plane of the last bottom as the innersole.

248. A machine of the class described having, in combination, end embracing wipers and means for supporting and actuating said wipers to force upper materials over an innersole on the bottom face of a last, said supporting and actuating means being located on the same side of the plane of the last bottom as the innersole and the machine being arranged to present a substantially unobstructed view of the top face of the shoe by the workman during the operation of the wipers.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELI BROTHERS.

Witnesses:
ARTHUR L. RUSSELL,
ELIZABETH C. COREPE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Corrections in Letters Patent No. 1,135,945.

It is hereby certified that in Letters Patent No. 1,135,945, granted April 13, 1915, upon the application of Eli Brothers, of Lynn, Massachusetts, for an improvement in "Machines for Use in the Manufacture of Boots and Shoes," errors appear in the printed specification requiring correction as follows: Page 6, line 53, for the word "portion" read *portions;* page 11, line 34, claim 19, for the article "the" read *its;* page 20, lines 62–63, claim 138, strike out the words "structurally independent of the overworking means;" same page and claim, line 64, after the word "means" insert the words *structurally independent of the overworking means;* page 22, line 38, claim 164, for the word "ligt" read *light;* page 25, line 19, claim 198, for the word "former" read *formed;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of October, A. D., 1915.

[SEAL.]

R. F. WHITEHEAD,
Acting Commissioner of Patents.

374

R. F. McFEELY.

MACHINE FOR WORKING UPPERS OVER LASTS.

APPLICATION FILED MAY 28, 1910.

1,135,958.

Patented Apr. 13, 1915.

2 SHEETS—SHEET 1.

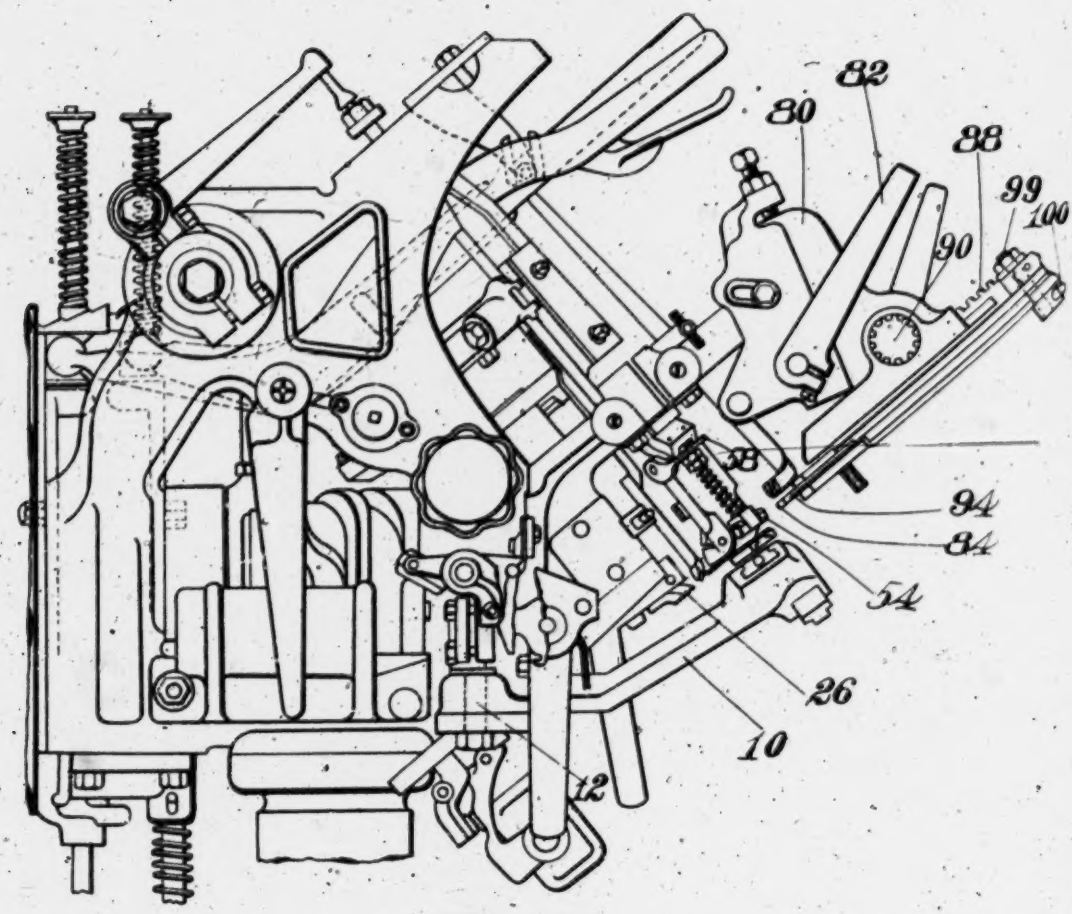


Fig. 1.

WITNESSES.

Elizabeth C. Coupe.

Edith C. Holbrook

INVENTOR.

Ronald F. McFeely

By his Attorney

Nelson W. Perrault

R. F. McFEELY.

MACHINE FOR WORKING UPPERS OVER LASTS.

APPLICATION FILED MAY 28, 1910.

1,135,958.

Patented Apr. 13, 1915.

2 SHEETS—SHEET 2.

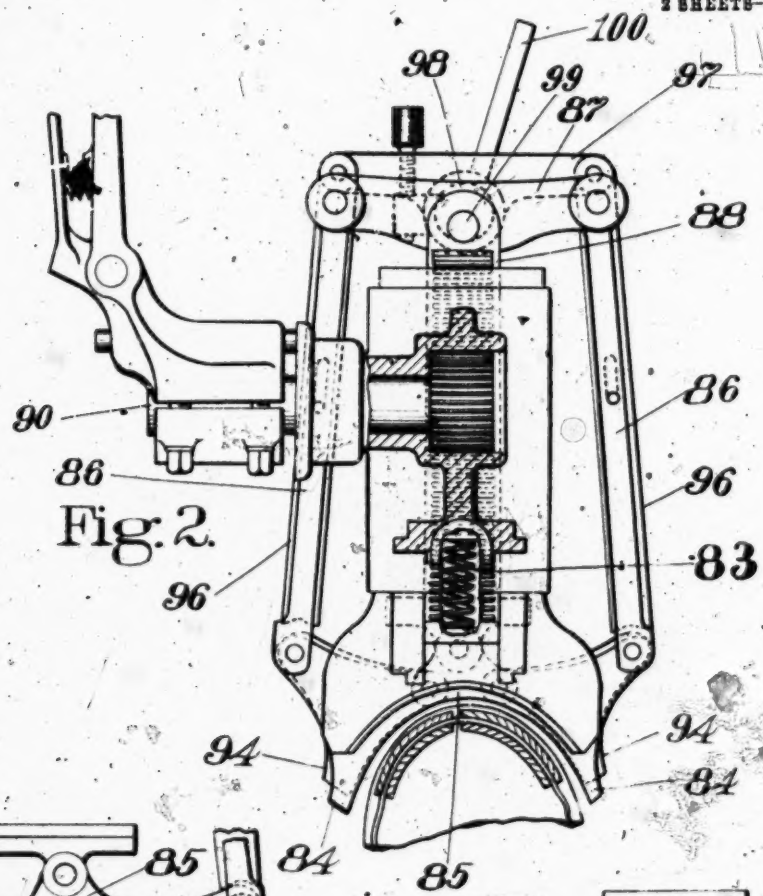


Fig. 2.

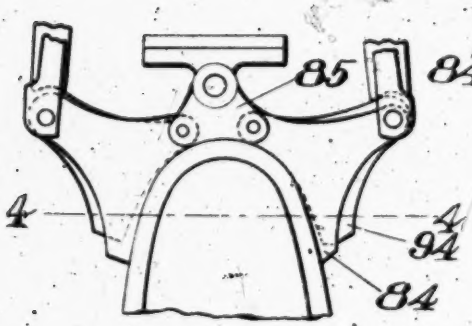


Fig. 3

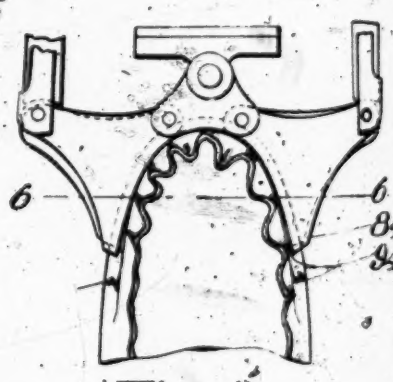


Fig. 5.



Fig. 4

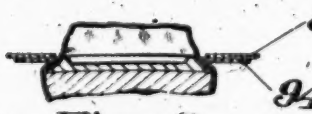


Fig. 6.

WITNESSES:

Elizabeth C. Comfs

Edith C. Holbrook

INVENTOR

Ronald F. McFeely

By his Attorneys

Nelson W. Howard

UNITED STATES PATENT OFFICE.

RONALD F. McFEELY, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR WORKING UPPERS OVER LASTS.

1,135,958. Specification of Letters Patent. Patented Apr. 13, 1915.

Original application filed April 19, 1909, Serial No. 490,848. Divided and this application filed May 28, 1910. Serial No. 563,907.

To all whom it may concern:

Be it known that I, RONALD F. McFEELY, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Machines for Working Uppers Over Lasts, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for use in working an upper over a last and particularly to mechanism for working an upper into lasted position over and about the toe portion of a last.

The invention is shown as embodied in a pulling-over and lasting machine of the type described in my prior application Serial No. 372,055 and the present application is a division of my application Serial No. 490,848, filed April 19, 1909, for improvements in pulling-over machines.

An object of this invention is to provide an end lasting mechanism having certain advantages in addition to those of the mechanism shown in said prior application, particularly in the direction of greater range of adaptability to varying shapes of lasts and greater efficiency in operation. It has been found that while the wipers of said application have a wide range of movement for lasts occupying different positions and having different shapes, as in the case of irregular right and left crooked lasts, yet a set of wiper plates which have an edge contour suitable for one shape of last will not force the upper inwardly into proper position against the shoulder of the innersole of a shoe which is much wider or narrower than that for which the plates are shaped.

With this and other conditions in view, an important feature of this invention consists in the provision of a plurality of wipers one of which is arranged above another. These wipers may be adaptable to different shapes of shoes, as by having different edge contours or by being mounted for different movements. In the illustrated embodiment of the invention two sets of wipers are employed one of which has an edge contour adapted for a last somewhat wider than that for which the other is shaped. In their use one set of wipers will force the upper snugly against the lip of the innersole about one part of the toe and the other will conform to another part and a great range of shapes is thus accommodated without removing the wipers and substituting others as it has heretofore been necessary frequently to do in the use of end lasting mechanism employing end embracing wipers.

Another feature of this invention consists in the provision of operating means for giving independent working movements to the different sets of wipers. As here shown the auxiliary wipers, as they may be termed for the purpose of designation without implying any limitation, are mounted below the main wipers and, while being arranged for movement lengthwise of the shoe with the main wipers, have separate means for closing them. By this operating means the auxiliary wipers may be closed to complete the lasting of the toe in case the toe is of a shape to which the main wipers cannot conform throughout their working edge.

A further feature of this invention is found in lasting means which comprises wipers that are adapted to embrace and conform to the contour of the side faces of the toe portion of a last and are mounted for movement to wipe upwardly along the side faces of the last toward the edge thereof and comprises other wipers which are adapted to slide over the first mentioned wipers and inwardly over the last bottom to wipe the upper over the innersole while the first wipers hold it clamped against the outer sides of the last. By this arrangement the liability of the upper slipping back when the wipers begin to wipe inwardly over the last edge is avoided and a well defined angular edge may be formed instead of the rounded edge which is liable to result from the usual rubbing action of the same wiper upwardly and then inwardly over the last edge. The two sets of wipers may be the main and auxiliary wipers above described the latter of which are employed for clamping and holding the upper about the outside of the last while the main wipers first close in over the last bottom. Another purpose for which the auxiliary wipers may

advantageously be used is to press the wire, which is commonly employed for binding the upper, into its seat under the main wipers and into holding relation to the upper which is pressed by the wipers against the lip of the innersole. For this purpose the wire may be drawn under the wipers while the main wipers hold the upper in lasted position, and after the auxiliary wipers are more or less retracted, and then the wire may be forced by the auxiliary wipers into its binding position while being held down by the main wipers. It is also to be noted that the closing of the auxiliary wipers between the margin of the shoe bottom and the main wipers, while the latter are pressing down, serves further to draw in and tighten the upper over the edge of the last.

These and other features of this invention, including certain combinations of parts and more important details of construction, will be explained in connection with the following description of the mechanism in which the invention is shown as embodied and then pointed out in the claims.

Figure 1 of the drawing is a side elevation of so much of the machine as it appears necessary to show for disclosing the present invention. Fig. 2 is a plan view partly in section showing main and auxiliary wipers of different edge contours. Fig. 3 is a plan view showing the main wipers closed about the side faces of a shoe to wipe the upper upwardly toward the shoe edge as indicated in the sectional view, Fig. 4, which is taken on the line 4—4 of Fig. 3. Fig. 5 is a view similar to Fig. 3 but showing the wipers closed in against the lip of the innersole to which the auxiliary wipers conform while the main wipers are too large for this contour. Fig. 6 is a section on line 6—6, Fig. 5. The upper pulling and adjusting mechanism may be the same as that shown in said prior application although an improved toe gripper which is curved to conform to the shape of the toe end of the last is shown in these drawings but, specifically, forms no part of this invention. This mechanism does not require to be herein described but reference may be had to said prior specification for further information than that found in these drawings. It should be understood, however, that this toe lasting mechanism is adapted for general use, separately from any other mechanism.

The toe lasting devices are carried by a head 80 yieldingly upheld in its inoperative position and capable of being moved downwardly by a rack and pinion controlled by the lever 82, as fully described in said prior application. The lasting devices include the main plates 84, 85, of which the former are connected by the links 86 with an equalizing lever 87 pivoted to a rack bar 88, which is actuated by a pinion on a lever shaft 91, while the wiper plate 85 is so connected to the rack bar 88 that it can yield backwardly and also can slide laterally with the plates 84 for adapting the contour of the acting edges of said plates to the shape of the particular last being operated upon. All these parts are fully described in said prior application and further explanation of them here is unnecessary. In addition to the wiper plates above described there are provided in accordance with this invention auxiliary wiper plates 94 located under the plates 84, as shown in Figs. 2 to 6. The auxiliary wipers are pivotally connected to the central wiper 85, being conveniently secured to the same pivot pin that fastens the wiper plates 84 to the plate 85. By this arrangement the auxiliary plates partake of the movements of the plate 85 both laterally and longitudinally of the shoe so that they are automatically positioned before the time arrives for them to be used. For actuating the auxiliary plates their outer corners are connected by links 96 with a cross bar or equalizing lever 97 within which is mounted an eccentric 98 which can be turned about a pivot pin 99 by a lever 100. The auxiliary wiper plates, which are thin as compared with the main plates, are adapted to be used after the main wiper plates have worked the upper substantially into position to be fastened and can be employed for crowding the upper, particularly at the corners of the toe, or the curved portions between the toe end and sides, firmly into the angle between the feather edge and the shoulder or lip of the innersole.

The auxiliary plates may and preferably will have a different edge contour from the plates 84, as is indicated in dotted lines in the drawings, to enable them to wipe the upper up to the shoulder of the innersole at the corners and sides of a shoe of different shape than that for which the main wiper plates are formed, as for example, one that is wider or has a squarer toe. By the use of the two sets of plates a wide range of shapes and widths of shoes can be lasted without changing the wiper plates for a different set of plates. As indicated in Figs. 3 and 4, the wipers may be used for rubbing the upper on the side faces of the last toward the edge thereof for stretching the upper and conforming it to the shape of the last. When the wipers have been raised to the edge of the last the upper or main set of plates may be closed to bend or break the upper inwardly over the last edge while the lower or auxiliary set of plates continue to clamp the upper against the side of the last. In this use of the wipers, the upper which has been stretched up has no opportunity to slip back while the edge is being bent over and wiped down upon the shoe bottom. It

is also found that by the use of these auxiliary wipers difficulties are overcome which have heretofore been experienced in smoothly lasting the corners of the toe and in firmly securing these portions of the upper in the angle of the innersole by the wire binder used for that purpose.

One of the advantages incident to the provision of main and auxiliary wipers is that in the operation of placing or seating the binding wire the upper plates 84 may be employed to hold the wire from rising while the lower plates crowd the wire into its seat which those plates may have been employed for making before the wire was introduced.

In one use for which the described mechanism is adapted, the toe gripper will retain its hold on the upper while the wipers are employed for wiping the upper upwardly along the sides of the last and the end wipers 84 are manipulated to force the upper inwardly over the corners of the toe while the middle wiper 85 and the auxiliary wipers 94 are clamping the upper against the sides of the shoe at the edge. Thereafter the wipers will be further lifted to the plane of the shoe bottom and the spring 83 will force the middle wiper 85 and the adjacent ends of the corner wipers forwardly to press the entire toe portion of the upper to the shoulder of the innersole. The lever 100 may then be manipulated to wedge the auxiliary wipers between the wipers 84 and the upper for tightening the upper, or to press the upper against the shoulder of the innersole at points not well fitted by the main wipers, or to force into holding position a wire which may have been drawn in under the plates 84, 84, 85. It is to be observed that the auxiliary wipers may be repeatedly opened and closed while the main wipers continue to hold the upper. Experience appears to indicate that this use of the auxiliary wipers will not be required for every shoe, but that they will need to be employed only in lasting particularly difficult work. It will be observed that the auxiliary wipers are arranged so that they will need to be used only when required and are not in the way during the use of the main wipers.

The manner in which the improvements herein described are to be employed has been made clear in connection with the description of the mechanism in which the invention is shown as embodied.

I claim as new and desire to secure by Letters Patent of the United States:—

1. A machine of the class described having, in combination, two wipers arranged one above the other, means for moving the wipers together, and means for moving the lower wiper independently.

2. In a machine of the class described, end lasting mechanism comprising two sets of connected wiper plates arranged one above the other and having different edge contours for working uppers over the toe end portions of lasts varying in edge contour, and means for actuating said wiper plates independently to do their work.

3. In a machine of the class described, an end lasting mechanism comprising two pairs of wiper plates arranged for wiping an upper inwardly over the edge of a last, said plates having different edge contours and being superposed one on the other, and means for actuating said plates.

4. In a machine of the class described, end lasting mechanism comprising two pairs of wiper plates having different edge contours arranged for use together on the same end of a shoe, and actuating devices arranged to permit said pairs of plates to be operated independently.

5. In a machine of the class described, end lasting mechanism comprising two sets of connected toe embracing wiper plates arranged one above the other, and suitable operating means for said plates, said plates being arranged to permit the upper one to be used for wiping the upper over the last and for holding down a binding wire while the lower one is actuated under the upper one for forcing the wire into holding position.

6. In a machine of the class described, end lasting mechanism comprising a center wiping plate and side plates pivotally connected to the center plate, and a second pair of side plates of different edge contour from the first pair also pivoted to the center plate and arranged for independent actuation.

7. In a machine of the class described, end lasting mechanism comprising the center wiping plate 85, the side plates 84, 94 superposed one upon another and pivotally connected to the center plate, and independent means for actuating the plates 84 and 94.

8. In a machine of the class described, an end lasting mechanism comprising, in combination, two sets of wipers constructed for wiping an upper inwardly over the edge of a last and arranged to operate upon the shoe while it continues to occupy the same position, and actuating means for the wipers constructed and arranged to permit one set of wipers to be operated at the will of the operator while the other set remains at rest.

9. A machine of the class described having, in combination, two wipers arranged one above the other and having capacity for inward wiping movements over the edge of a last, and means for imparting like positioning and working movements to both wipers and also separate working movements to one of the wipers.

10. A machine of the class described having, in combination, two wipers arranged one above the other and having capacity for inward wiping movements over the edge of

a last, means for moving the wipers together, and means for imparting additional working movements to one wiper.

11. A machine of the class described having, in combination, sets of wipers which are movable to wipe the upper upwardly along the sides of the shoe toward the last edge and also are arranged for inward wiping movements over said edge, and means to actuate the upper set of wipers to wipe the upper inwardly over the edge of the last bottom while the lower set continues to clamp the upper against the side of the last.

12. A machine of the class described having, in combination, toe lasting wipers to work an upper over a last bottom and hold it, and means to engage a toe binding wire and push it ahead of the engaging means between the shoe upper and the lower face of the wiper toward upper holding position.

13. A machine of the class described having, in combination, toe lasting wipers formed and arranged to embrace the toe of a shoe to work an upper over the last bottom and hold it, auxiliary wipers mounted below the first mentioned wipers and substantially co-extensive therewith, and operating means by which the auxiliary wipers can be wedged between the lower face of the main wipers and the upper.

14. An end lasting machine including end embracing wipers comprising a central plate, end plates pivotally connected therewith, and auxiliary end plates also pivotally connected with the central plate.

15. An end lasting machine including end embracing wipers comprising a central plate, end plates pivotally connected therewith, auxiliary end plates also pivotally connected with the central plate, means for actuating said central plate and end plates together, and additional means for actuating the auxiliary plates about their pivotal connections with the central plate.

16. A machine of the class described having, in combination, toe lasting wipers arranged to work an upper into lasted position and hold it to permit a wire to be drawn under the wipers toward position to bind the upper, and means movable over each corner of the toe between the overlaid upper and the wipers to force the wire firmly into holding position at the corners of the toe.

17. In a machine of the class described, end lasting mechanism comprising a center wiping plate and side wiping plates pivotally connected to the center plate, and a second pair of side wiping plates also pivoted to the center plate and arranged below the first pair of side wiping plates.

18. In a lasting machine a central wiping plate, a pair of side plates pivotally connected thereto and a second pair of side plates of different shape also pivoted to the center plate and arranged for independent actuation for lasting shoes having edge contours dissimilar to the edges of the plates.

19. A machine of the class described having, in combination, end lasting plates including wipers arranged for actuation to bend the upper over the last bottom at the corners of the toe, and additional wipers arranged for independent operation for wiping the entire toe portion of the upper into lasted position.

20. In a machine of the class described, end lasting mechanism comprising two superposed pairs of lasting plates, one of said pairs being arranged for bending the upper over the last bottom at the corners of the toe, and the other pair of wipers being mounted for actuation independently of the first-mentioned pair of lasting plates and arranged for wiping the entire toe portion of the upper into lasted position.

21. In a machine of the class described, an end lasting mechanism comprising two sets of wiper plates arranged for use together on the same end of a shoe and supported for relative lateral movements to adapt them for operation upon different portions of right and left crooked lasts, and means permitting independent operation of said two sets of plates.

22. In a machine of the class described, an end lasting mechanism comprising two pairs of superposed wiper plates having different edge contours and supported for relative lateral movements to adapt them for operation upon different portions of right and left crooked lasts, and means permitting independent operation of said two sets of plates.

23. In a machine of the class described, an end lasting mechanism comprising two pairs of superposed toe embracing plates, each pair of plates being mounted for combined advancing and turning movement to close and open relatively to the shoe end, the edges of said two pairs of plates being of different curvature.

24. In a machine of the class described, an end lasting mechanism comprising two pairs of superposed toe embracing plates, each pair of plates being mounted for combined advancing and turning movement to close and open relatively to the shoe end, the edges of said two pairs of plates being of different curvature, and means by which either pair of embracing plates can be closed independently of the other pair.

25. In a machine of the class described, an end lasting mechanism comprising two pairs of superposed toe embracing plates, each pair of plates being mounted for combined advancing and turning movement to close and open relatively to the shoe end, the edges of said two pairs of plates being

of different curvature, operating means by which said plates can be made to embrace the shoe, and additional means by which one pair of the plates can be further closed independently of the other pair, substantially as and for the purpose described.

26. An end lasting mechanism having, in combination, end embracing wipers having an edge contour approximately conforming to the contour of the side faces of the last around the toe portion of a shoe and mounted for movement to wipe upwardly along the side faces of the last toward the edge thereof, and other wipers which are adapted to slide over the first-mentioned wipers and inwardly over the shoe bottom to wipe the upper over the innersole while the first wipers hold the upper clamped against the outer sides of the last or against the edge of the innersole where the latter forms a continuation of the side faces of the last, and operating means by which to effect the toe embracing and the upward wiping movements of the first-mentioned wipers and the inward wiping action of the last-mentioned wipers.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RONALD F. McFEELY.

Witnesses:
CHARLES H. HOYT,
CHESTER E. ROGERS.

384

M. BROCK.

LASTING MACHINE.

APPLICATION FILED JUNE 29, 1912.

1,188,616. Patented June 27, 1916.

4 SHEETS—SHEET 1.

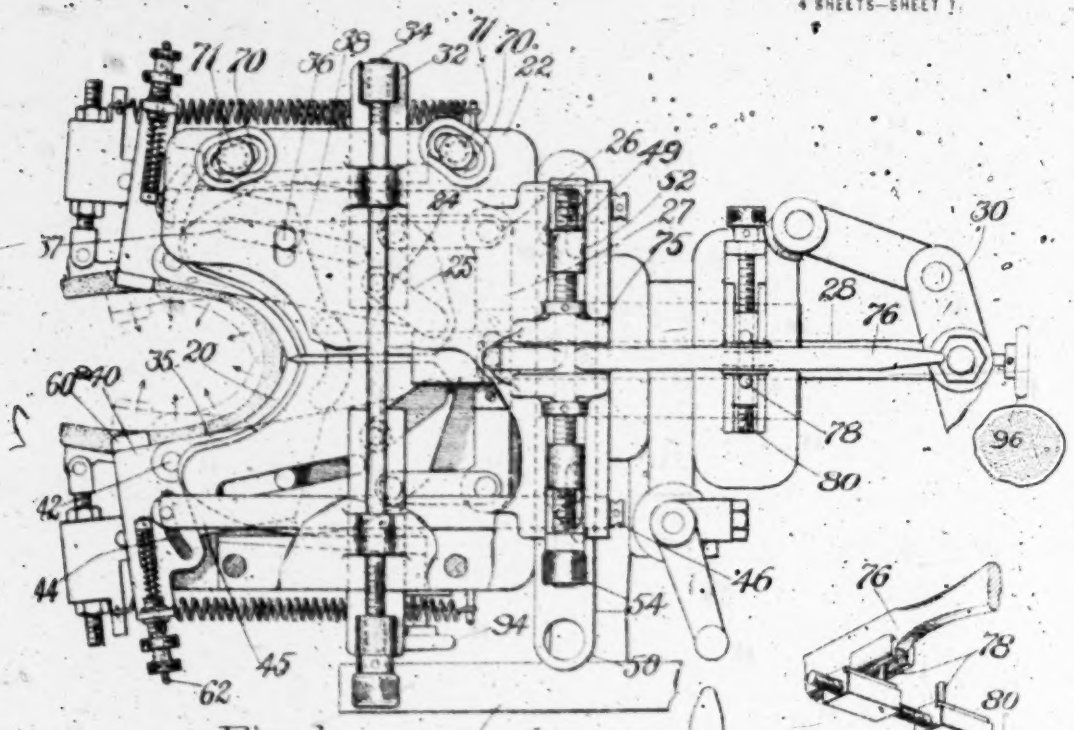


Fig. 1.

Fig. 8.

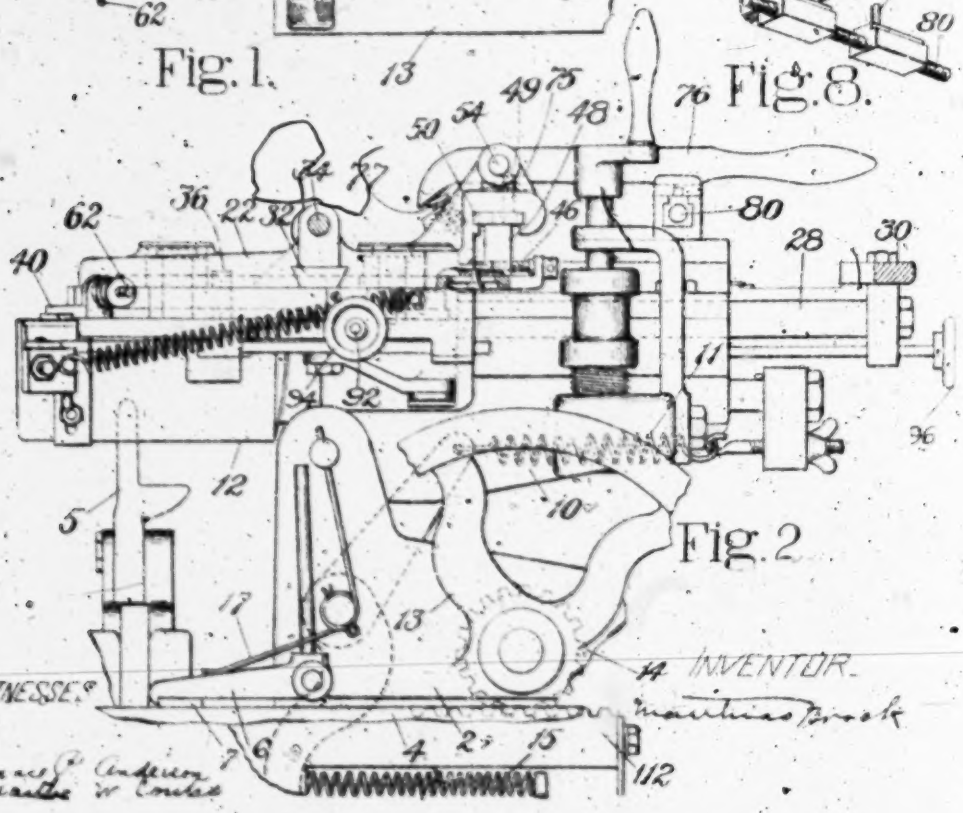


Fig. 2.

WITNESSES:

INVENTOR.

386

M. BROCK.
LASTING MACHINE.
APPLICATION FILED JUNE 29, 1912.

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4 SHEETS—SHEET 2.

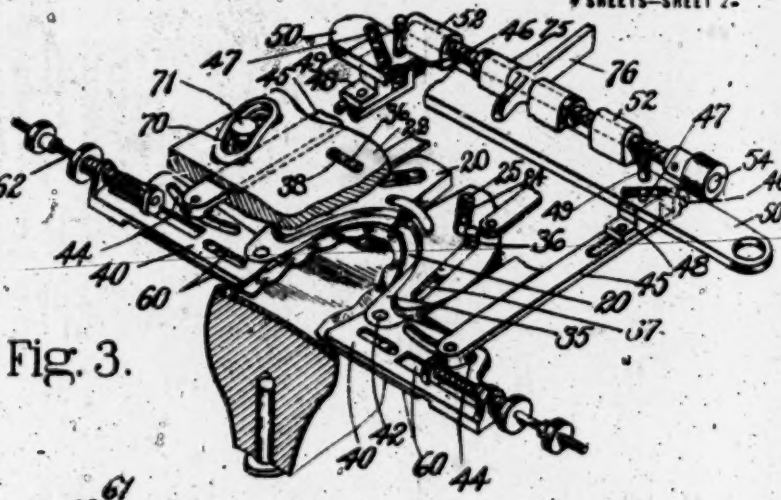


Fig. 3.

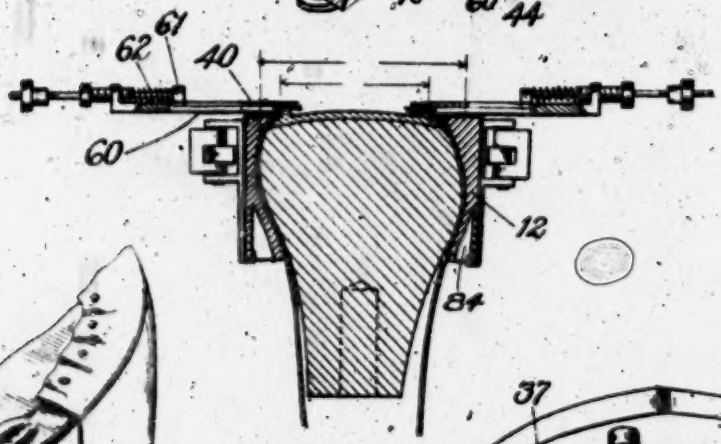


Fig. 4.

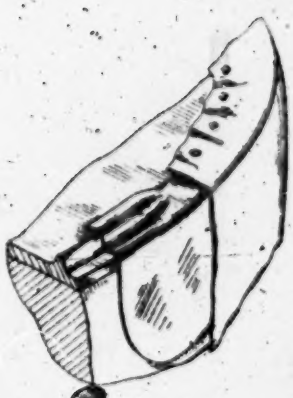


Fig. 7.

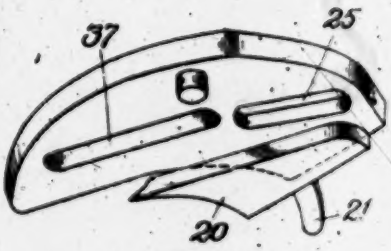


Fig. 5.

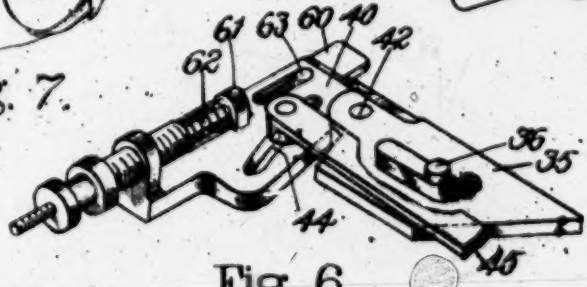


Fig. 6.

WITNESSES

Jennie P. Anderson

Martha W Cowles

INVENTOR.

Matthias Brock

M. BROCK.

LASTING MACHINE.

APPLICATION FILED JUNE 29, 1912.

1,188,616.

Patented June 27, 1916.

4 SHEETS—SHEET 3.

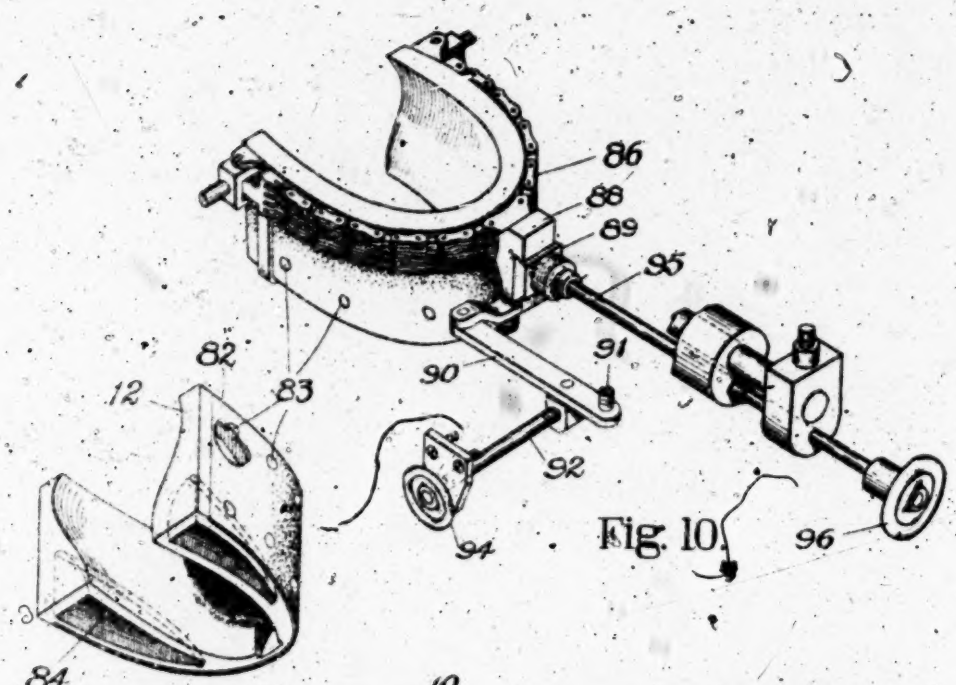


Fig. 10.

Fig. 9.

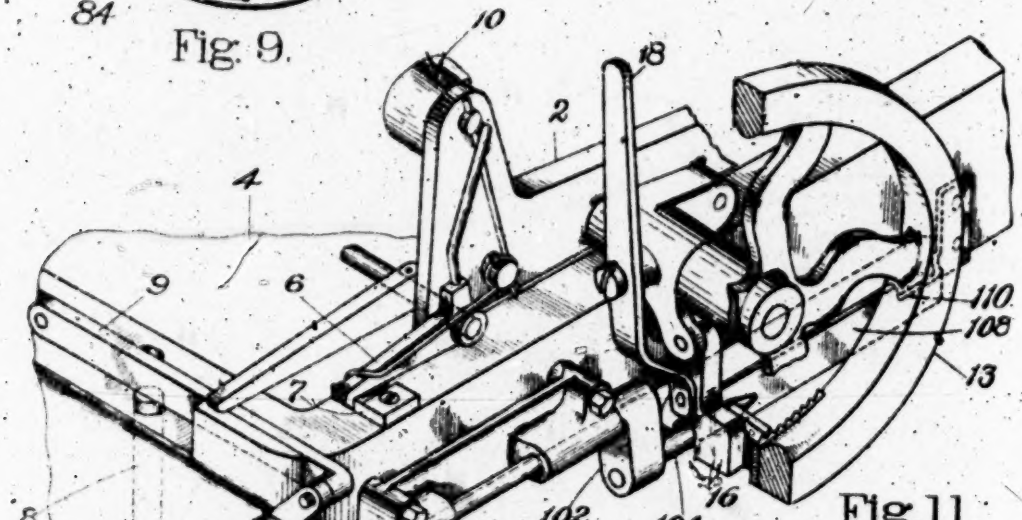


Fig. 11.

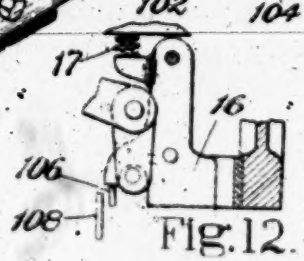


Fig. 12.

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LASTING MACHINE.

APPLICATION FILED JUNE 29, 1912.

1,188,616.

Patented June 27, 1916.

4 SHEETS—SHEET 4.

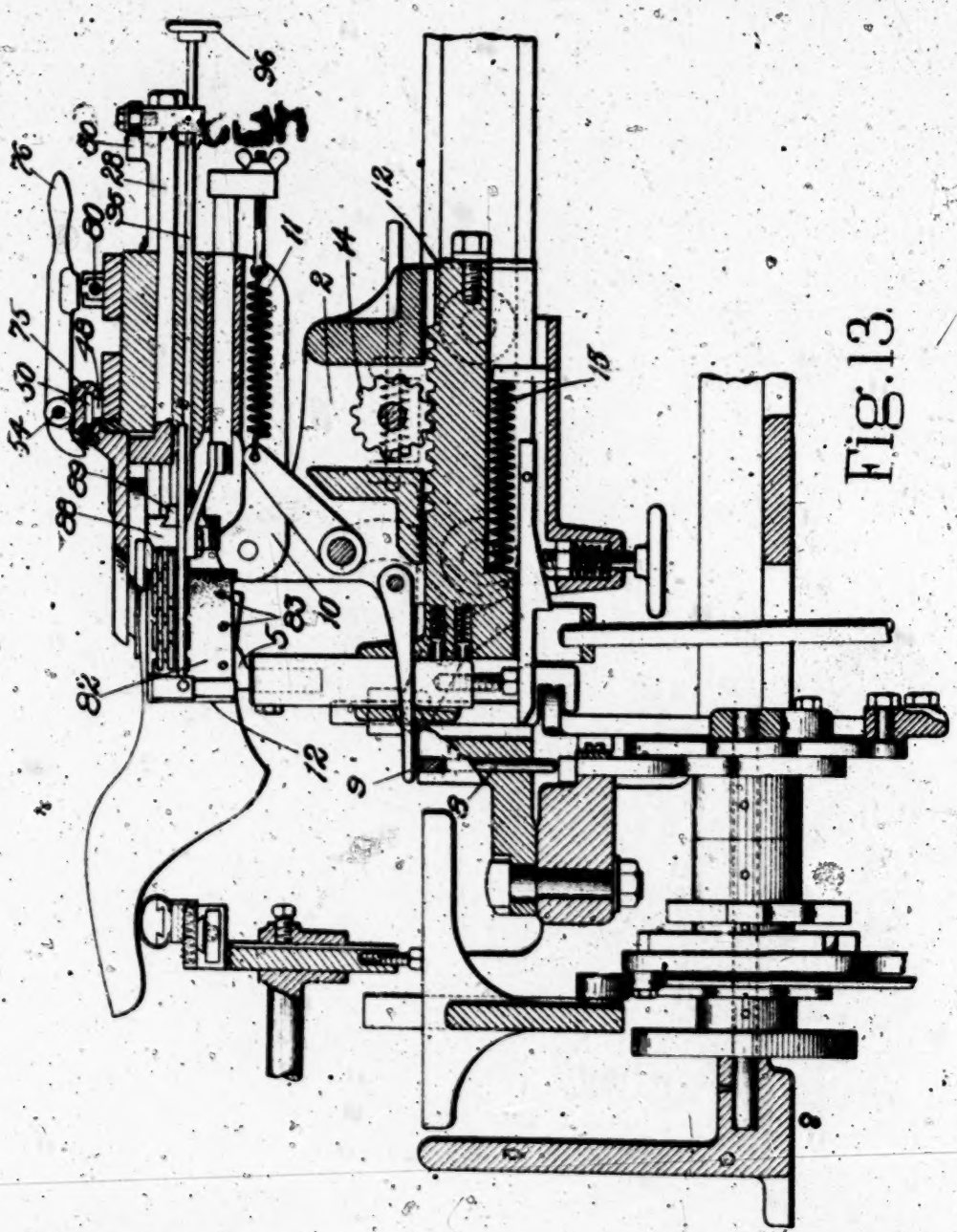


Fig. 13.

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LASTING-MACHINE.

1,188,616. Specification of Letters Patent. Patented June 27, 1916.

Application filed June 29, 1912. Serial No. 706,655.

REISSUED

To all whom it may concern:

Be it known that I, MATTHIAS BROCK, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to lasting machines, and has for one of its main objects to improve end lasting mechanisms.

An important feature of this invention consists in provision for relative angular adjustment of the heel wipers and the heel embracing band to adapt each of said instrumentalities to the contour of the portion of the last particularly acted upon by each.

In modern lasts the contour of a right or a left last in the plane of the heel seat is substantially different from the contour of the same last in a plane one half or three quarters of an inch below the heel seat. This difference is largely produced by under cutting the inner side of each last to produce a narrow shank. The wipers have to deal with the heel seat contour and the band with the lower contour. In the illustrated embodiment of this feature of the invention the adjustment is shown as produced by moving the wipers, together with their actuating mechanism, about a center located near the rear end of the heel whereby the wipers may be swung inwardly over the inner side of a right or the inner side of a left heel seat.

Another important feature of this invention consists in improved end lasting wipers and operating mechanism therefor. In the illustrated embodiment of this feature of the invention each portion of the wipers moves inwardly over the shoe bottom in a direction substantially perpendicular to the adjacent portion of the shoe edge, and only in that direction. This is to be distinguished from a wiper the closing and advancing movement of which carries it lengthwise of the shoe edge on the side of the shoe in order that it may close over the end of the shoe. The desired object is herein shown as secured by forming each of a pair of end embracing wipers in a plurality of relatively movable sections. As shown a rear end section of a heel wiper has the usual closing and advancing movement appropriate for the curved end of the heel; a second section has a closing movement only without advancing; and a third section has a closing and a backwardly turning movement to adapt it to the incurve at the front of the heel and at the shank. Preferably this backwardly turning movement is variable for different shapes of lasts, as, for example, in its starting and finishing points.

A further feature of this invention consists in novel means for shaping the end portions of the heel stiffener flange which are to be included in the inseam that connects the welt and upper to the innersole lip of a welt shoe. The stitches of the inseam require to be located close down to the base of the lip and these portions of the heel stiffener material tend to bridge from the edge of the innersole to the top of the lip and offer substantial difficulty in sewing the end portions of the inseam. The pressure of usual wipers or lasting plates is insufficient to shape this stiff material. I have therefore, in accordance with the illustrated embodiment of this feature of the invention provided special stiffener end shapers for this purpose which automatically shape the stiffener ends during the lasting operation. These shapers may be advantageously set into the lower face of the end sections of the wipers and normally are projected inwardly therefrom yieldingly so that they engage the stock in advance of the wipers when the wipers are closed and so that, in partaking of the turning movement of the end sections of the wipers, they rub edgewise and crease the stock with yielding pressure against the base of the innersole lip.

Still another feature of the invention consists in means operative during the usual unjacking operation for delaying the rearward movement of the shoe until the toe rest has been lowered so that a high toed last can be withdrawn without objectionably scraping it over the toe rest.

The improvements herein described are applicable to the machine shown in my Patent No. 1,018,477 to which reference may be had for fuller drawings and description of previously known portions of the machine.

These and other features of the invention, including combinations of parts, provisions for adjustments and more important details of construction will now be described in connection with the drawings and then pointed out in the claims, except the improvements in methods of making uppers herein disclosed which is claimed in my co-pending application, Ser. No. 62,041, filed Nov. 17, 1915.

Figure 1 is a top plan view of a heel lasting mechanism embodying this invention, the cap-plate being partially broken away, and arrows being applied to indicate the directions of movement of the respective sections of the new wipers. Fig. 2 is a side elevation of what is shown in Fig. 1. Fig. 3 is a perspective view to disclose details. Fig. 4 is a section showing the action of the stiffener end shapers carried by the wipers. Fig. 5 shows the lower side of the rear section of one of the wipers. Fig. 6 shows the front section of one of the wipers and the stiffeners end shaper carried on it. Fig. 7 shows the result of the action of a stiffener end shaper on a shoe. Fig. 8 is a detail of an adjuster. Fig. 9 is a perspective view of the novel heel band. Fig. 10 shows the means for adjusting the rear end of the heel band transversely of the machine and the means for adjusting the band lengthwise in the machine. Fig. 11 shows the combination for delaying the retraction of the lasted shoe in unjacking, and Fig. 12 is a detail showing the hand wheel lock controller of Fig. 11 in front elevation. Fig. 13 is a longitudinal section.

The heel lasting carriage 2 is movable forwardly over the frame 4 to clamp endwise, the shoe carried by the heel post 5 and is locked by a latch 6. The head 10 supports the heel embracing band 12 and all these parts are or may be constructed and actuated substantially as in my prior United States patent excepting as hereinafter pointed out.

The wipers, which are guided over a supporting face on the head 10 and confined by a cover plate 22, are each formed in a plurality of sections all of which have an operating connection through the rear sections 20 which are joined by a tongue 21. These sections have guide slots 25, Figs. 3 and 5, for studs 24, and through links 26 are jointed to a cross bar 27 on the front end of a plunger 28 actuated by a hand lever 30, Fig. 1.

The sections 20 are confined edgewise by edge walls on head 10 as may be seen in Fig. 1 to have a combined advancing and inwardly closing operative movement, and the studs 24 are mounted on separate slides 32 by which, and the right and left threaded rod 34, the sections 20, and through them the other sections of the wipers, can be adjusted to open more or less for wide and narrow shoes. Each section 20, see Fig. 5, is chamfered off on its lower side to receive the middle section 35 which partakes of the closing movement of section 20 but is restrained from advancing movement relatively to the shoe. This is accomplished by providing on the upper face of section 35 an elongated projection, Fig. 6, which fits into the slot 37 in section 20 to compel the turning movement. The projection has on its upper face a pivot stud 36 which stands in a transverse slot in cap plate 22, Fig. 1. These connections cause sections 20 and 35 respectively to close over the heel seat in directions substantially perpendicular to portions of the last edge adjacent to them.

The end sections 40 of the wipers are each pivoted at 42 to the front end portion of the section 35 and therefore have no forward movement. Instead thereof each end section has a cam slot 44 in which stands a stud on the front end of a lateral stationary bar 45 so that said section is compelled to swing rearwardly when the wipers close, as indicated by the arrows, Fig. 1. This makes its direction of closing about perpendicular to the adjacent portion of the last edge in the region of the heel breast line and causes it to tend to gather backward over the heel seat stock which usual constructions of wipers push forwardly into the shank.

The bars 45 carry adjustably by screws 46, Figs. 1, 2, and 3, on their rear portions blocks 48 having upstanding studs reaching into slots 47 in an adjusting bar 50. The slots are inclined in reverse directions so that endwise movement of bar 50 will advance one bar 45 and retract the other bar to adjust wiper end sections 40 oppositely about pivots 42 for the curve of the portion of the right or a left shoe to be acted upon by them. Adjustment of end sections 40 separately for more or less curvature can be made by the screws 46. The movement of adjusting slide 50 can be limited for the style of last being operated upon by studs 49 and stop blocks 52 which are adjustable by right and left threads on a rod 54.

Each end section 40 is cut away on its lower side to receive, flush, the stiffener end shaper 60, Figs. 3, 4, 6, which has a lug 61 projecting up through a slot in wiper section 40. This lug has a narrow neck, as has also a second stud 63, by which necks the shaper is supported to slide beneath the section 40. A spring pressed plunger 62 holds the shaper normally projected in ad-

vance of the wiper as in Fig. 1, and permits it to yield back of the wiper's edge as in Figs. 3 and 4 so that, after making early engagement with the work, the shaper will press the upper and end portion of the stiffener into lasted position in the angle between the feather edge and rib or shoulder of a welt innersole. Then, while continuing the pressure, the shaper will rub edgewise as it partakes of the movement of wiper section 40 about pivot 42. This rubbing movement is for the purpose of permanently shaping the stock as in Fig. 7. The shaper may retire under the wiper section 40, and the wiper fold the stock over the innersole lip, as in Fig. 4, before the lug 61 reaches the limit of its movement relatively to section 40 and exerts a final unyielding inward pressure.

The cap plate 22 has slots 70 curved about a common axis located near the rear end of the heel band and said plate, together with the wipers, is thereby made adjustable about said center relatively to the heel band to adapt the wipers to the contour of the tread face of the last as distinguished from the contour which the heel band must fit. The wipers are free to accompany the cap plate in this adjustment, the cross bar 27 being slotted for this purpose, and are compelled to do so by the studs 36. The cap has an arm 75, being the support for adjusting slide 50, in which is pivoted on rod 54 the adjusting lever 76 and a spring 77 under the front end of the lever holds its handle end down to engage one or another of two stop pins 78, Fig. 8, or, it may be, in confinement between the two pins. By swinging the lever and engaging it over one pin the wipers will be adjusted relatively to the heel band for a right shoe and when it is engaged over the other pin they will be adjusted for a left shoe of the same pair of shoes. The pins are carried on blocks which are adjustable simultaneously in reverse directions by a screw rod 80. When the lever 75 is centered between the pins the wipers will be symmetrical with the heel band. The cap plate is confined by headed stud screws 71 which permit the sliding adjustment provided by the slots 70.

The heel band 12 is preferably made as shown in Figs. 4, 9 and 10. The body portion of the band consists of a composition of balata-gum and leather fibers or shreds which can be molded by a moderate degree of heat that is insufficient to injure the leather fibers or the leather backing 82 with which the band is shown as provided. The inner face of the band, which is unlined, takes a hard glassy surface under the heavy molding pressure. This glassy face is retained through the life of the band and enables it to be used on colored upper leathers, such as russet stock, without producing the discoloration which results from the friction of a leather band upon colored uppers. This is perhaps due in part to the fact that the composition band conforms to the shape of the last so that its pressure is more fully distributed than is that of a leather band and also in part to the fact that the glassy surface of the balata band grips, or adheres to, the leather of the shoe upper with a non-slipping engagement greatly in excess of that of a leather band. In practice, this characteristic is utilized in several ways. For example, the band, which is highly resilient and does not lose its resiliency as does a leather band, preferably is initially formed a little narrower than the average width of the shoe heels so that as the shoe and the band are moved relatively, the one into the other, for jacking the shoe the band grips the upper at the corners; between the end and side faces, of the last and tensions it forward tightly around the rear end of the last. Also it has been discovered that in the use of this band the tack which is put into the rear end face of the shoe in the assembling operation, to hold the upper materials from displacement relatively to the heel portion of the last during the pulling-over operation and the lasting operations, can be withdrawn before the lasting operation if this heel band is used. This is because this band grips and holds the upper so securely that it prevents the stock from being drawn up between the band and the last by the inward wiping action of the lasting plates or wipers upon the heel seat. This is a great advantage because heretofore the life of a heel band has been largely determined by the extent of abrasion of the band by this heel end tack.

The leather protective covering 82 is preferably molded upon the band and has perforations through which the composition is pressed to form integral studs 83 connecting the band to the covering, said studs being headed more or less on the outside of the covering as an incident to the molding operation and forming a secure connection of the covering to the band. The band may have a vertically straight outer face which with the inner face, molded to conform to the contour of the last forms a thick wall at the lower portions of the ends of the band, as is best shown in Fig. 9. These thick walls are preferably chambered out as at 84 to reduce the weight of the band and to add to the resiliency of the end portions of the band. Preferably the band is shaped with the lower portions of its sides abnormally close together relatively to the upper portions so that when the band is closed about the last by the usual band end operating mechanism, such for example as that shown in my earlier Patent, No. 1,002,818, the lower portions of the resilient band will

engage the shoe first and the area of engagement will spread progressively toward the upper edge to wrap the stock toward the edge of the last and then hold it clamped against the side of the last throughout the height of the band. By this invention, therefore, the band closing mechanism operates through the resilient side walls of the peculiarly formed band to apply clamping pressure to the upper materials through the lower portions as well as through the upper portions of the band as contemplated by the generic claims of Patent No. 1,030,519, granted June 25, 1912 on application of Albert A. MacLeod.

The heel band through its chain 86, Fig. 10, is attached at its rear closed end to a block 88 which is dovetailed upon a head 89 for sliding adjustment transversely of the machine. The block 88 has a lateral arm pivotally connected to the front end of a lever 90 of the third class that is fulcrumed at 91 and has threaded engagement with an adjusting rod 92 carrying a hand wheel 94. The head 89 has threaded engagement with a rod 95 having a hand wheel 96 by which the band can be adjusted lengthwise, both adjustments being independent of the wipers.

The heel carriage latch 6 is automatically lifted from the catch 7 by plunger 8 and swinging bar 9 as one of the first steps in the unjacking operation which is more fully explained in said earlier Patent No. 1,018,477, and the carriage is then retracted by a spring 11, Fig. 2. The last pin 5 is carried by a toothed slide 112, Fig. 2, through which the shoe is drawn back into the heel band by a hand wheel 13 having a pinion 14 engaging the slide, said slide compressing a spring 15. The inner face of the hand wheel rim is toothed as in Figs. 11 and 12 for engagement by a swinging latch 16 actuated by a spring 17 and having a hand operating lever 18.

Referring now to Figs. 11 and 12, the free end of bar 9 is connected by a link with an arm of a rockshaft 100 the rear arm 102 of which carries a rearwardly projecting finger 104 having a pointed end. The latch 16 has a notch in its lower edge within which the finger stands during the heel seat lasting. When the unjacking operation occurs the parts are timed to lift the latch 6 and, by the time the spring 11 begins to retract the lasting head, to turn the rockshaft 100 and withdraw the latch 16 from the hand wheel 13, whereupon spring 15 acts to hold the heel pin slide and the shoe forward while spring 11 is drawing the lasting head 10 with the wipers and heel band away from the shoe. During this time the toe rest, Fig. 13, is being lowered by the unjacking mechanism. The pin is long enough to hold the latch 16 out of contact with the hand wheel as long as it is necessary for the last pin slide to have movement relative to the lasting head for delaying the retraction of the last and then to permit reëngagement of the latch with the wheel rim whereby the shoe is caused to be drawn off the toe rest after the rest has been lowered. Alternatively the latch 16 may be held away from the hand wheel during the entire backward movement of the lasting head and to this end the latch has a depending pin 106 which is carried and held by the finger 104 to the inner side of a guide-bar 108 that is fastened to the side of the frame. When the latch slides backwardly beyond the end of the finger the pin catches against the inner side of the guide-bar which may have a notch 110 at its rear end to let the finger out again.

In using the machine the wipers are set by lever 76 for a right or left shoe, being adjusted more or less for the style of the last by the threaded rod 80, and the end sections and shank shapers are also correspondingly adjusted for the same last by the slide plate 50 and threaded rod 34. The shoe is then jacked as usual and the wipers closed by lever 30 to lay the upper over the heel seat. In so doing the rear section 20 is advanced and turned; the side section 35 is closed in substantially a right line sweep transversely of the last, guided by slot 38 which prevents any advance movement of this section; the end section 40 is carried inwardly, without advancing, by section 35 and is also turned backwardly toward the end of the heel by its cam slot 44, according to the adjustment of bar 45; the stiffener end shaper 60 is advanced into early engagement with the stock, pressing it against the base of the inner-sole lip and then yielding relatively to end section 40 while it accompanies that section in turning about pivot 42 to rub the stock edgewise of the shaper. The operator usually backs off the wipers partially to uncover the tacking line while he is inserting the tacks, but the shaper 60 is yieldingly held to its work continuously and simply gets an edgewise rubbing movement at such times. The wipers are usually advanced again over the tacks and the shoe raised by a treadle against the wipers to iron down or compress the heel seat while the operator is lasting the toe. The stiffener end shaper preferably has a thin edge to make its creasing action more effective but it is covered by the wiper as in Fig. 4 when the shoe is raised and is thereby prevented from springing. It is to be noted that the operating mechanism gives to the shaper 60 a yielding end pressure, an edgewise rub toward the heel end, a slight reverse rub when the wipers are partially backed off, a similar return, and finally an edgewise rub toward the shank

after the compression which is incident to the raising of the jack. This effectively shapes the stock as shown in Fig. 7. When the heel has been lasted and tacked the wipers may be advanced over the tacking line and the heel raised to leave the stock under compression against the lower face of the wiper sections and the shaper 60 while the toe is being lasted, after which the shoe is unjacked by depressing the unjacked lever, as in said earlier Patent, No. 1,018,477. When this is done the hand wheel 13 is unlocked in the described time relation to the other unjacking movements to delay the reaction of the shoe until after the toe rest has descended far enough to allow the toe to pull off from it easily.

The heel band and its adjusting mechanism are not claimed in this application but are included in a divisional application, Ser. No. 38,913, filed July 9, 1915.

Having explained the nature of this invention and described a preferred construction embodying the same I claim as new and desire to secure by Letters Patent of the United States:—

1. In a lasting machine the combination with an end embracing band, of end embracing wipers which are operatively connected together, and means for effecting lateral angular adjustment of the band and wipers relatively about a definite substantially vertical axis.

2. In a lasting machine the combination with an end embracing band, of end embracing wipers which are operatively connected for angular adjustment laterally together in the same direction and relatively to the band, right and left stops for limiting such adjustment equally in opposite directions and means for adjusting said stops simultaneously.

3. In a lasting machine the combination with an end embracing band, of end embracing wipers which are operatively connected together, means for effecting lateral angular adjustment of the band and wipers relatively about a substantially vertical axis, and a locking latch arranged to secure the parts in definite right or left relative adjustments and also to fasten them in central relative position.

4. In a lasting machine the combination with an end embracing band, of end embracing wipers which are operatively connected together and are guided for angular adjustment in the plane of their acting faces relatively to the band, the lever 76 for effecting such adjustment, the stops 78, the adjusting and supporting rod 80 on which the stops are mounted and the spring 77 arranged to hold the lever in locking relation to one or another or both of said stops as described.

5. In a lasting machine the combination with a heel band having a depth to extend from the tread face for a substantial distance down the side faces of the heel of an inverted last and constructed and arranged to embrace the heel portion of the last and locate the heel end of the last laterally in the machine; of heel wipers and operating mechanism to cause the wipers to embrace the heel and wipe the upper materials over the heel seat face of the last; and means for relatively positioning the heel band and the heel wipers laterally about a substantially vertical axis including devices to determine definite angular positions for right and left lasts at either side of a median position for straight lasts.

6. In a lasting machine the combination with a heel band having a depth to extend from the tread face for a substantial distance down the side faces of the heel of an inverted last and constructed and arranged to embrace the heel portion of the last and locate the heel end of the last laterally in the machine; of heel wipers and operating mechanism to cause the wipers to embrace the heel and wipe the upper materials over the heel seat face of the last; and means to effect a wiper adjustment relatively to the band to adapt the wipers to the contour of the bottom face of the last positioned laterally by the band embracing the last substantially as described.

7. In a lasting machine the combination with a heel band having a depth to extend from the tread face for a substantial distance down the side faces of the heel of an inverted last and constructed and arranged to embrace the heel portion of the last and locate the heel end of the last laterally in the machine; of heel wipers and operating mechanism to cause the wipers to embrace the heel and wipe the upper materials over the heel seat face of the last, said wipers being adjustable together in the same direction angularly relatively to the band to adapt them to differences in contour between the portions of the last which the band and the wipers embrace.

8. In an end lasting machine heel embracing wipers each comprising a heel end wiper section mounted to advance and turn inwardly and a heel side wiper section which has inward movement without any advancing movement.

9. In an end lasting machine heel embracing wipers each comprising a heel end wiper section, a heel side wiper section and connected operating means for actuating the end sections inwardly and forwardly and actuating the side sections inwardly without forward movement.

10. In a lasting machine the combination with operating mechanism, of wiping means adapted to embrace the heel portion

of a shoe and constructed and arranged relative to said operating mechanism to wipe forwardly over the rear end portion of the heel, inwardly with less forward movement over the sides of the heel and inwardly without forward movement over the front portions of the heel.

11. In a lasting machine the combination with operating mechanism, of wiping means adapted to embrace the heel portion of a shoe and constructed and arranged relative to said operating mechanism to wipe inwardly and forwardly over the rear end portion of the heel and simultaneously to wipe inwardly and backwardly over the front portions of the heel.

12. In an end lasting machine heel embracing wipers each comprising a heel end wiper section mounted to advance and turn inwardly and another wiper section which has inward and backward movement simultaneously with the movement of the end section, the acting edges of said sections being located in the same horizontal plane.

13. In an end lasting machine heel embracing wipers each comprising end sections which are advanced and turned inwardly and side sections which are connected to the end sections to receive inward movement therefrom and are restrained from advancing movement.

14. In an end lasting machine heel embracing wipers each comprising an end section having the thickened acting edge portion and the thin side portion and the side wiper section mounted on the thin portion and having an acting edge in continuation of that of the end section substantially as described, and means for actuating said two sections in different paths.

15. In an end lasting machine heel embracing wipers each comprising a heel end wiper section, having a curved acting edge and a thin lateral extension provided with slots, a side wiper section mounted under said thin extension and having a stud pivoted therein with a foot block located in one of the slots, a cover plate having a slot angular to the last-mentioned slot and into which the stud projects, and means operatively connected with the heel end section for advancing and turning it and causing the side section to be turned about the axis of the stud.

16. In an end lasting machine heel embracing wipers each comprising a heel end wiper section, a plurality of side sections and guiding and operating mechanism arranged to actuate adjacent side sections respectively, one inwardly and forwardly and the other inwardly and rearwardly.

17. In an end lasting machine, heel embracing wipers each comprising a heel end section, a heel side section, and a heel seat section, and connected means for actuating said sections in different paths including means for directing movement of the heel side section backwardly and inwardly over the shoe bottom.

18. In an end lasting machine, heel embracing wipers each comprising a heel side section and a heel seat section having pivotal movement relatively to the front end of the side section and connected means for actuating the side section inwardly and actuating the seat section inwardly and rearwardly.

19. In an end lasting machine, heel embracing wipers each comprising a heel side section and a heel seat section pivoted thereto, means for adjusting the normal angular relation of said sections into different operative positions, and means for actuating the wipers.

20. In an end lasting machine the combination with wiper operating mechanism, of heel embracing wipers comprising means to wipe the upper over the rear end portions of the heel and forwardly extending members adjustably connected with said end wiping means at each side of the heel, and means to maintain said members in different operative relations to said end wiping means.

21. In an end lasting machine the combination with wiper operating mechanism, of heel embracing wipers comprising means to wipe the upper over the rear end portions of the heel, and forwardly extending members pivotally connected with said end wiping means at each side of the shoe and adjustable about their pivotal connections to adapt them for the greater incurve at the inner side of the heel than at the outer side of the heel of right and left crooked lasts.

22. In an end lasting machine the combination with wiper operating mechanism, of heel embracing wipers comprising wiping means extending forwardly along the sides of the heel, and end sections jointed thereto and adjustable thereon independently of the action of the operating mechanism.

23. In an end lasting machine, heel embracing wipers each comprising a heel side section and a heel seat section pivoted thereto, means for adjusting the normal angular relation of said sections, and actuating means for relatively moving the wipers to effect the lasting operation.

24. In an end lasting machine, heel embracing wipers each comprising a heel side section and a front end section connected therewith to permit angular turning movement in the plane of said sections, means for holding said sections in different angular relations, and operating means for relatively moving said wipers to effect the lasting operation.

25. In an end lasting machine, heel embracing wipers each comprising a heel side

section and a heel seat section connected therewith to permit angular turning movement in the plane of said wiper sections, means for adjusting the normal angular relation of said sections and actuating mechanism therefor having provision for accelerating the movement of the seat section while the side section is being moved.

26. In an end lasting machine, end embracing wipers each comprising a rear section and a side section, operating means for imparting to the rear section an advancing and a laterally inward movement to close over the curved end of the shoe and for imparting to the side section an inward movement without advancing.

27. In an end lasting machine, end embracing wipers each comprising a rear section and a side section, operating means for imparting to the rear section an advancing and a laterally inward movement to close over the curved end of the shoe, connections from the rear section to actuate the side section and means to modify the direction of movement of the side section and cause it to differ from that of the rear section.

28. In an end lasting machine, end embracing wipers comprising means to lay the upper over the rear and side portions of a heel, and end sections; mechanism for imparting operative movements to the overlaying means, connections from said means to operate the end sections, and means to modify the direction of movement of the end sections and cause their movement to differ from that of the first mentioned overlaying means.

29. In an end lasting machine, end embracing wipers each comprising a rear section and a side section, operating means for imparting to the rear section an advancing and a laterally inward movement to close over the curved ends of the shoe, connections from the rear section compelling the side section to partake of the inward movement of the rear section and other means controlling advancing movement of the side section.

30. In an end lasting machine, end embracing wipers each comprising a rear section and a side section, operating means for imparting to the rear section an advancing and a laterally inward movement to close over the curved end of the shoe, a sliding connection between the sections arranged to carry the side section inwardly with the rear section, a cover, and a slot and pin connection between the cover and side section for controlling advancing movement of the side section.

31. In a heel lasting machine, end embracing wipers, each comprising a rear section, a side section and an end section, means for advancing the rear section and turning it inwardly to close over the curved end of the heel seat, connections therefrom to move inwardly the side and end sections and means to restrain the side and end sections from partaking of the advance of the rear section.

32. In a heel lasting machine, end embracing wipers, each comprising a rear section, a side section and an end section, and operating means for advancing and simultaneously turning inwardly the rear sections to close over the curved rear end of the last, and for closing inwardly without advancing to a like extent the side and end sections of the wipers.

33. In a heel lasting machine, end embracing wipers, each comprising a rear section, a side section and an end section, and operating means for advancing and simultaneously turning inwardly the rear sections to close over the curved rear end of the last, said operating means acting through the rear section to close inwardly the side and end sections, and other means for controlling advancing movement of the side and end sections.

34. In a lasting machine, end embracing wipers each comprising a rear section, a side section with relation to which the rear section can slide longitudinally of the shoe, and operating means for turning inwardly and forwardly sliding the rear section and turning inwardly the side section.

35. In a lasting machine, end embracing wipers each comprising a rear section, a side section with relation to which the rear section can slide longitudinally of the shoe, and operating means for turning inwardly and forwardly sliding the rear section and moving inwardly the side section; combined with means for controlling the direction of the inward movement of the side section independently of the rear section.

36. In a lasting machine, end embracing wipers each comprising a rear section, a side section with relation to which the rear section can slide longitudinally of the shoe, and an end section carried by the side section and having an independent movement thereon, and means for imparting appropriately different movements to the several sections, for the purpose described.

37. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear section takes place and which partakes of the inward movement of the rear section.

38. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear

section takes place and which partakes of the inward movement of the rear section, and means for imparting additional inward movement to the front end section.

39. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear section takes place and which partakes of the inward movement of the rear section, and means for imparting to the front end section an additional inward movement having a backward component toward the rear end of the heel.

40. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear section takes place and which partakes of the inward movement of the rear section, and means which is adjustable to impart to the front end section a variable movement inwardly while the rear section is being advanced and moved inwardly.

41. In an end lasting machine, heel embracing wipers each comprising a rear section, a front end section and connected means for actuating the rear section forwardly and inwardly over the curved rear end of the heel and for actuating the front end section inwardly and backwardly in a curve substantially perpendicular to the incurve on the side of a shoe near the heel breast and rear portion of the shank.

42. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear section takes place and which partakes of the inward movement of the rear section; and means for adjusting the front end sections of the wipers relatively to the rear sections.

43. In an end lasting machine, heel embracing wipers each comprising a rear section, means for moving it forwardly and inwardly over the curved rear end of the heel, and a front end section which partakes of the inward movement of the rear section, and means permitting and maintaining adjustment of the front end sections of the wipers relatively to the rear sections.

44. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear section takes place and which partakes of the inward movement of the rear section; and means for adjusting the front end sections of the wipers together toward the left or toward the right for right and left crooked lasts.

45. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section relatively to which the forward movement of the rear section takes place and which partakes of the inward movement of the rear section; means for adjusting the front end sections of the wipers together toward the left or toward the right for right and left crooked lasts and also means for adjusting said front end sections relatively for differences in degrees of crookedness in lasts.

46. In an end lasting machine, heel embracing wipers each comprising a rear section, means for actuating it forwardly and inwardly over the curved rear end of the heel, and a front end section which partakes of the inward movement of the rear section; and means for adjusting said front end sections relatively to each other and to the rear sections for differences in degrees of crookedness in lasts.

47. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers carried by the wipers and receiving automatically during the operation of the wipers a stiffener end shaping movement additional to the movement of the wipers.

48. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers carried by the wipers, means for advancing and closing the wipers to wipe the upper over the end and sides of the heel into lasted position upon the heel seat of the shoe, and operating connections through which the stiffener end shapers are caused to partake of the closing movement of the wipers but not of the advancing movement.

49. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers carried by the wipers, means for advancing and closing the wipers to wipe the upper over the end and sides of the heel into lasted position upon the heel seat of the shoe, and operating connections through which the stiffener end shapers are caused to partake of the closing movement of the wipers and are simultaneously moved reversely to the direction of advancing movement of the wipers.

50. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers carried by the wipers, means for operating the wipers to do their work, and means to cause the shapers to close against the work and to rub the shoe backwardly for

creasing the stock into the angle between the feather and the lip or rib of a welt innersole while the wipes are operating.

51. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers carried by the wipers, and normally projecting yieldingly in advance thereof to engage the work ahead of the wipers and receive a movement lengthwise of the shoe as they yield backwardly while the wipers advance and close, and means for advancing and closing the wipers.

52. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers set into the lower face of the wipers and normally projecting inwardly therefrom yieldingly so that they engage the stock first when the wipers are closed.

53. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers set into the lower face of the wipers and normally projecting inwardly therefrom yieldingly so that in partaking of the turning movement of the wipers they rub edgewise and crease the stock with yielding pressure against the base of the innersole lip, and means for advancing and turning the wipers.

54. In a heel seat lasting machine, heel seat lasting wipers, and heel stiffener end shapers set into the lower face of the wipers and normally projecting inwardly therefrom yieldingly and adapted to yield back of the wiper's edge to press the stock against the base of the lip of the innersole while the overlying portion of the wiper folds the edge of the stock over the lip.

55. In a heel seat lasting machine, wipers, operating means therefor, stiffener end shapers movable about pivots near the front ends of the wipers, and coöperating cam slots and rolls operatively connected with said operating means to impart to the shapers a movement about their pivots.

56. In a heel seat lasting machine, wipers, operating means therefor, stiffener end shapers movable about pivots near the front ends of the wipers, coöperating cam slots and rolls operatively connected with said means to impart to the shapers a movement about their pivots additional to the movement of the portions of the wipers upon which they are pivoted, and adjustable means for varying the said additional movement.

57. In a lasting machine, the combination with a vertically movable toe rest, a last pin, a heel lasting head in which the last pin is supported for rearward movement against yielding resistance, means for locking the last pin in adjusted position in the lasting head, and means for locking the head in its forward position against yielding resistance, of unjacking means for releasing the toe rest, the lasting head and the last pin, arranged to allow initial backward movement of the lasting head relatively to the last pin while the toe rest is descending to relieve the toe supporting pressure before the shoe is drawn off the rest by the last pin.

58. In a lasting machine, the combination with a toe rest, a heel lasting head having a heel band and wipers and movable rearwardly away from the toe rest to open the machine for taking out a lasted shoe, and a last carrier supported in the lasting head, of unjacking means arranged to delay the retraction of the last carrier until the toe supporting pressure of the toe rest has been relieved and then to free the shoe from the toe rest and from the band and wipers.

59. In a lasting machine having heel seat lasting mechanism including a longitudinally movable head, a heel band and wipers carried therein, and means for locking the head in operative position, means for retracting it, a last carrier, means to actuate the last carrier to jack the shoe back into the heel band, a spring to move the carrier reversely and means to lock the last carrier to the head, combined with unjacking means arranged to unlock the lasting head and for automatically unlocking the last carrier from the head before it retracts the shoe.

60. In a lasting machine the combination with an automatically retractable heel lasting head, means for locking it, an automatically forwardly pressed last carrier in the head, and means for locking it to the head, of connected means movable for unlocking the head and the carrier in time relation to delay the retraction of the shoe after the head has begun to move backwardly.

61. In a lasting machine the combination with a retractable heel lasting head, a track over which it travels, a last carrier, a ratchet faced hand wheel to retract the last carrier in the head, and a pawl carried on the head to lock the hand wheel, of a rail on the track to be engaged by the pawl to hold it free from the hand wheel during the retraction of the lasting head, and means to disengage the pawl from the hand wheel and cause it to become engaged with the rail.

62. In a lasting machine the combination with a movable heel lasting head, means for locking it, a last carrier, means including the toothed hand wheel 13 for retracting the last carrier relatively to the lasting head, and the pawl 16 for locking the hand wheel, of the rockshaft 100 arranged for operation automatically when the lasting head is unlocked and to withdraw the pawl 16 from the hand wheel.

63. In a lasting machine the combination with a movable heel lasting head, a support

therefor, a last carrier, means for retracting the last carrier relatively to the head, and retaining means for holding the last carrier in its retracted position, of means for automatically freeing the retaining means from the last carrier in time relation to the movement of the head on the support, and means for maintaining the retaining means free during the travel in one direction of the head on its support and formed to allow it to act during travel in the other direction.

64. In a lasting machine the combination with a movable heel lasting head, a last carrier, means for retracting the last carrier relatively to the lasting head, of means for locking the last carrier in its retracted position, of means operated in time relation with the movement of the lasting head for releasing the last carrier and means dependent upon the position of the lasting head for permitting reëngagement of the locking means with the last carrier.

65. In an end lasting machine, end embracing wipers each comprising a side section and an end section, and operating means for imparting to the end section a combined advancing and laterally inward movement to close over the more curved portion of the end of the shoe and for imparting simultaneously to the side section an inward movement with less forward movement than is imparted to the end section.

66. In a lasting machine, end embracing wipers each comprising a rear section, a side section with relation to which the rear section can slide longitudinally of the shoe, and operating means for turning inwardly and forwardly sliding the rear sections and for imparting the required lasting movements to the side section.

67. A machine of the class described having, in combination, end lasting wipers comprising coöperating lasting plates each having relatively movable heel end, side and shank members; and means for moving said members relatively during the closing of the wipers over the shoe bottom.

68. A machine of the class described having, in combination, end lasting wipers comprising coöperating plates each having a heel end member which advances and swings inwardly over the rear end and a corner of the heel, a side member which closes inwardly over the side of the heel, and a shank member which swings backwardly and inwardly.

69. A machine of the class described having, in combination, end lasting wipers comprising coöperating lasting plates including shank members which move rearwardly during the closing of the plates over the shoe bottom.

70. A machine of the class described having, in combination, end lasting wipers comprising coöperating lasting plates including end members which move toward one another during the closing of the plates over the shoe, and a side member relatively to which said end members are moved.

71. A machine of the class described, having, in combination, end lasting wipers comprising coöperating lasting plates each including a side member which has a movement inwardly over the shoe bottom without forwardly advancing movement, and a shank member movable with said side member and having an additional swinging movement backwardly.

72. A machine of the class described having, in combination, a wiper cam plate, operating means to advance and turn the cam plate, a wiper member rigid with said cam plate, a second wiper member connected to said cam plate for turning movement thereby, and means for restraining the second member from advancing movement with the cam plate.

73. A machine of the class described having, in combination, end lasting wipers comprising a lasting plate, means for swinging it over the side of the heel of a last, a second lasting plate pivotally connected with the first-mentioned plate, and means for turning the second lasting plate about said pivot automatically during the closing movement of the first-mentioned plate.

74. A machine of the class described having, in combination, two wipers constructed and arranged to embrace the heel portion of a shoe, each of said wipers comprising relatively movable members connected together, and means for operating said members to wipe the upper over the end and sides of a heel in directions substantially perpendicular to the edge portion of the heel at all points.

75. A machine of the class described having, in combination, two wipers constructed and arranged to embrace an end portion of a shoe and mounted for relative turning movement about an axis located substantially in the line in which their adjacent ends meet, one of said wipers being provided with a tongue located back of the wiping edges and curved in an arc about said axis and the other of said wipers having a recess shaped to receive said tongue and guide it during movement of the wipers about said axis.

76. A machine of the class described having, in combination, two wipers constructed and arranged to embrace an end portion of a shoe and mounted for relative turning movement about an axis located substantially in the line in which their adjacent ends meet, one of said wipers being provided with a tongue located back of the said axis and of less thickness than the wiper, and the other

wiper having in one face a seat of proper proportions to receive and guide the tongue flush with the surface of the wipers.

77. A machine of the class described having, in combination, two wipers constructed and arranged to embrace an end portion of a shoe and mounted for relative turning movement about an axis located substantially at their meeting ends, said wipers being provided in one face with a guideway located at a distance back from said axis and curved about said axis, and a tongue fitted in said guideway and long enough to bridge the gap between the wipers in all of the relative positions which the wipers occupy during use.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MATTHIAS BROCK.

Witnesses:
ARTHUR L. RUSSELL,
WILLIAM B. KING.

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LASTING MACHINE.

APPLICATION FILED APR. 28, 1913.

1,245,117.

Patented Oct. 30, 1917.

7 SHEETS—SHEET 7.

Fig. 12.

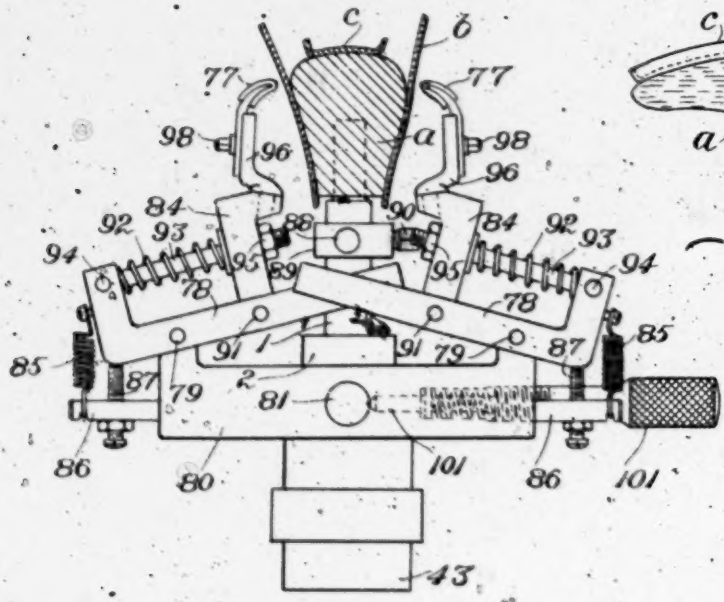


Fig. 11.

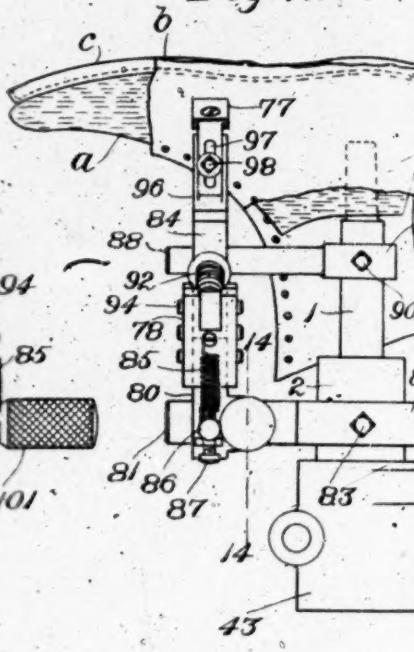


Fig. 13.

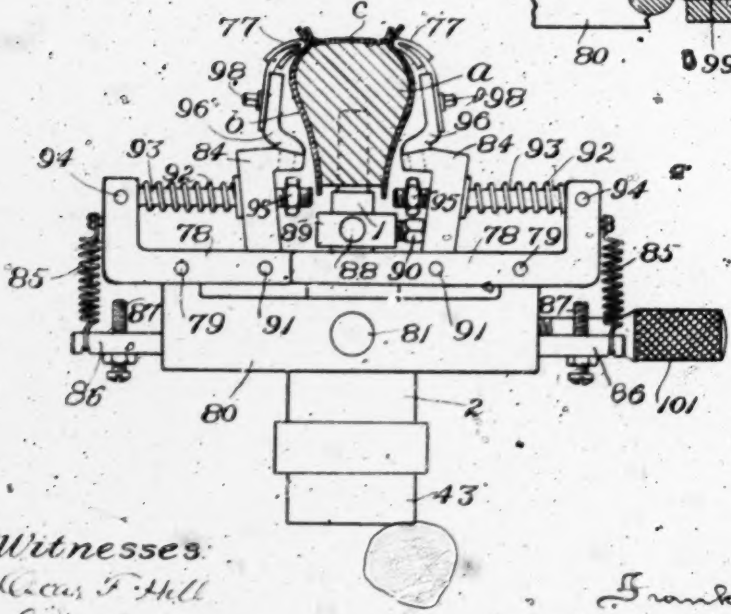
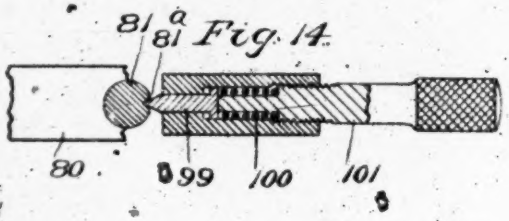


Fig. 14.



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APPLICATION FILED APR. 28, 1913.

1,245,117.

Patented Oct. 30, 1917.

7 SHEETS—SHEET 6.

Fig. 9.

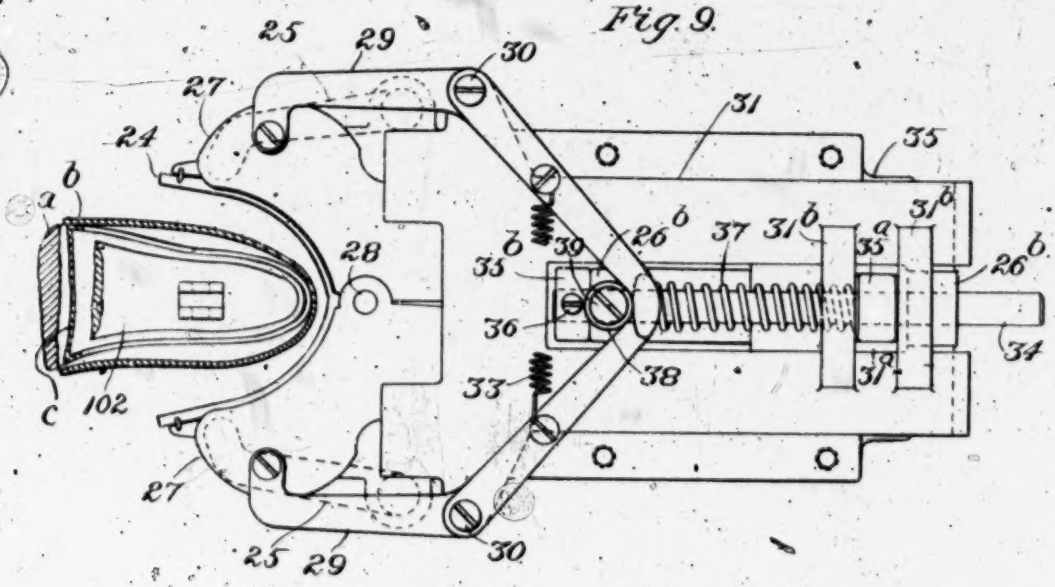
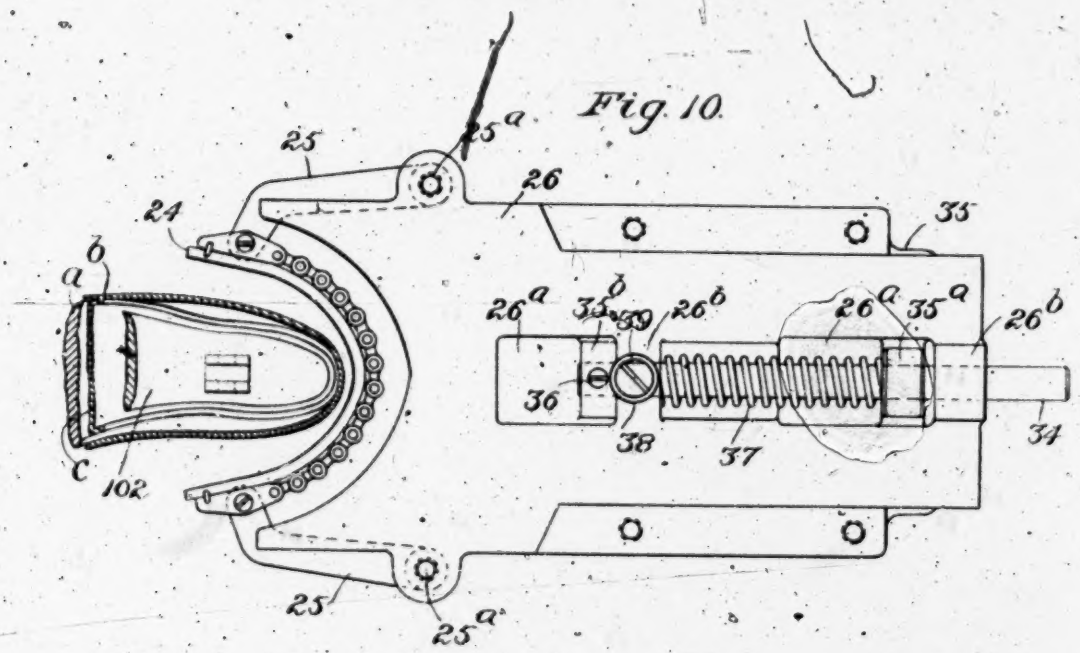


Fig. 10.



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1,245,117.

Patented Oct. 30, 1917.

7 SHEETS—SHEET 5.

Fig 8.

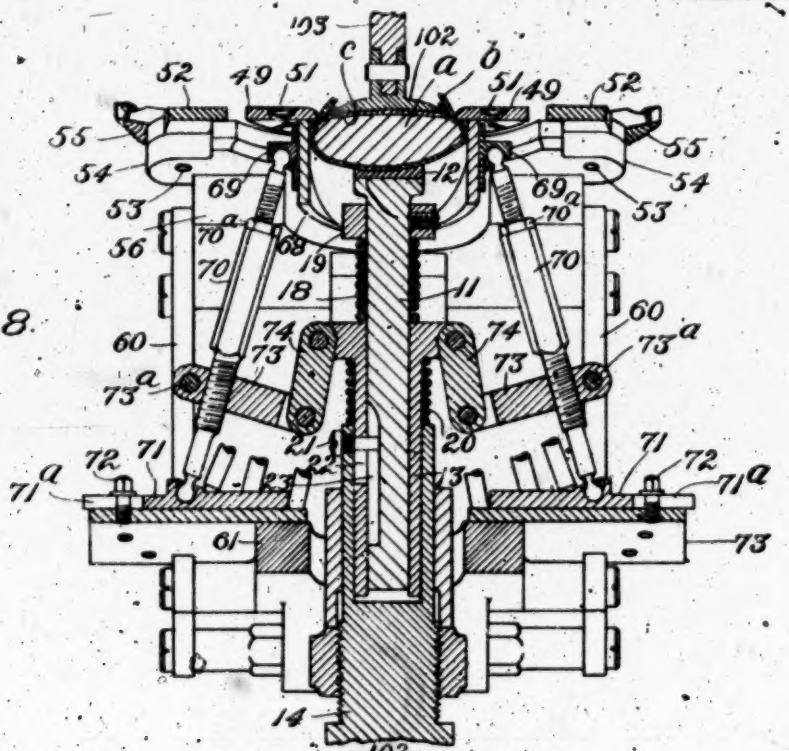
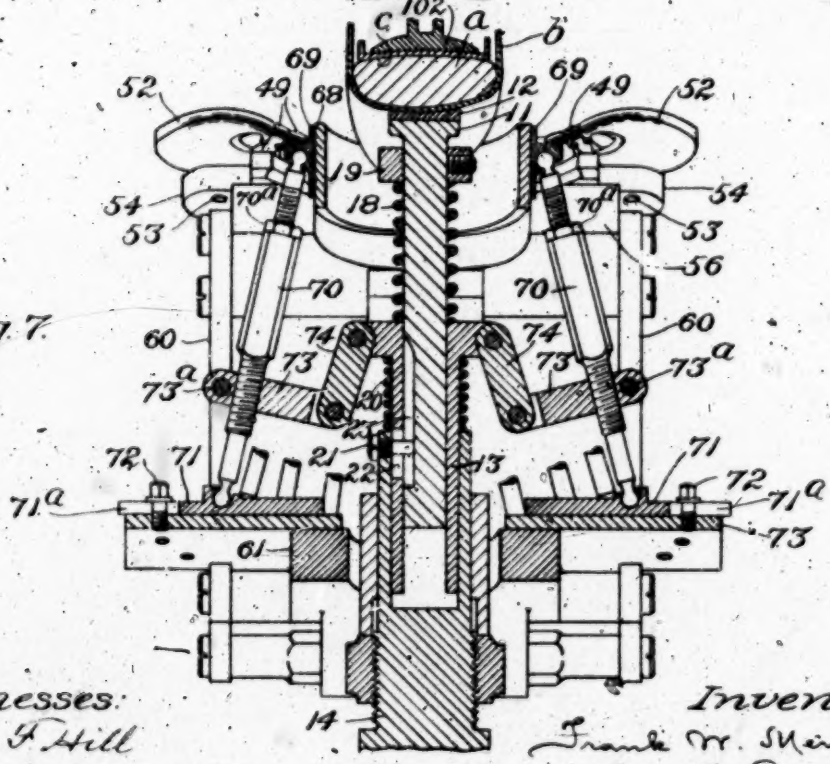


Fig 7.



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1,245,117. Patented Oct. 30, 1917.

7 SHEETS—SHEET 4.

Fig. 5.

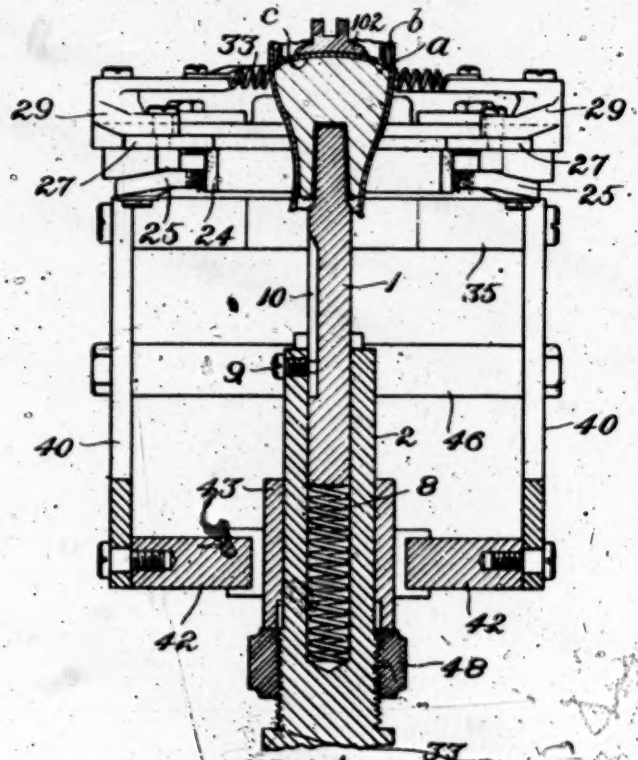
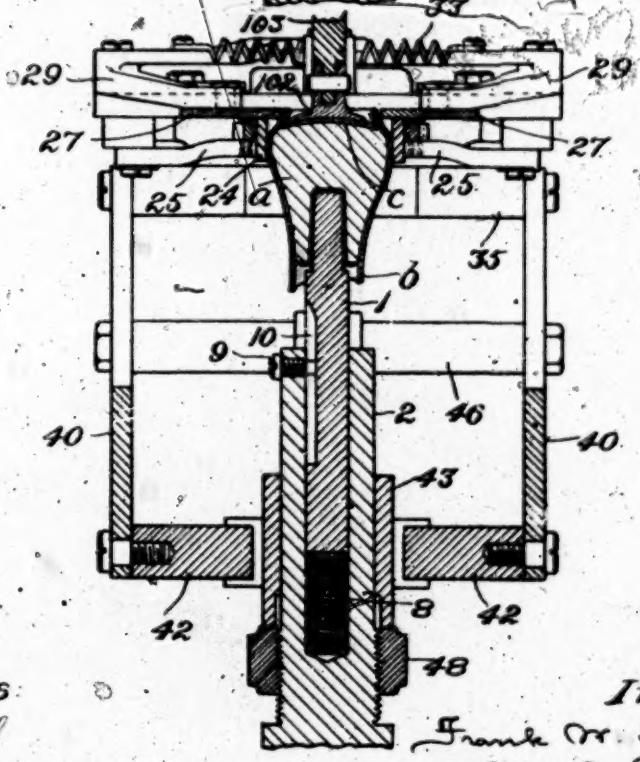


Fig. 6.



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LASTING MACHINE.

APPLICATION FILED APR. 28, 1913.

1,243,117.

Patented Oct. 30, 1917.

7 SHEETS—SHEET 3.

Fig. 3.

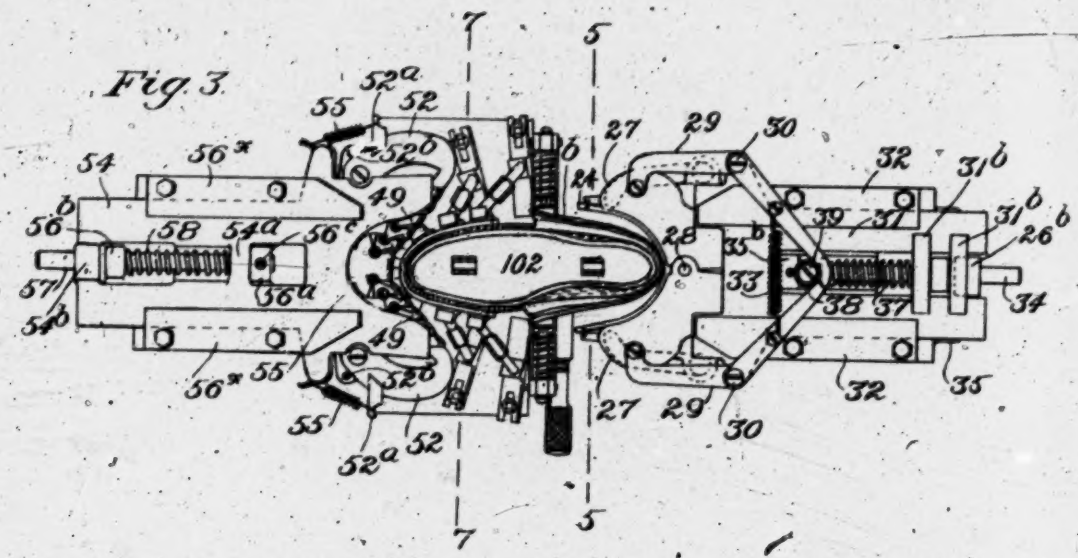
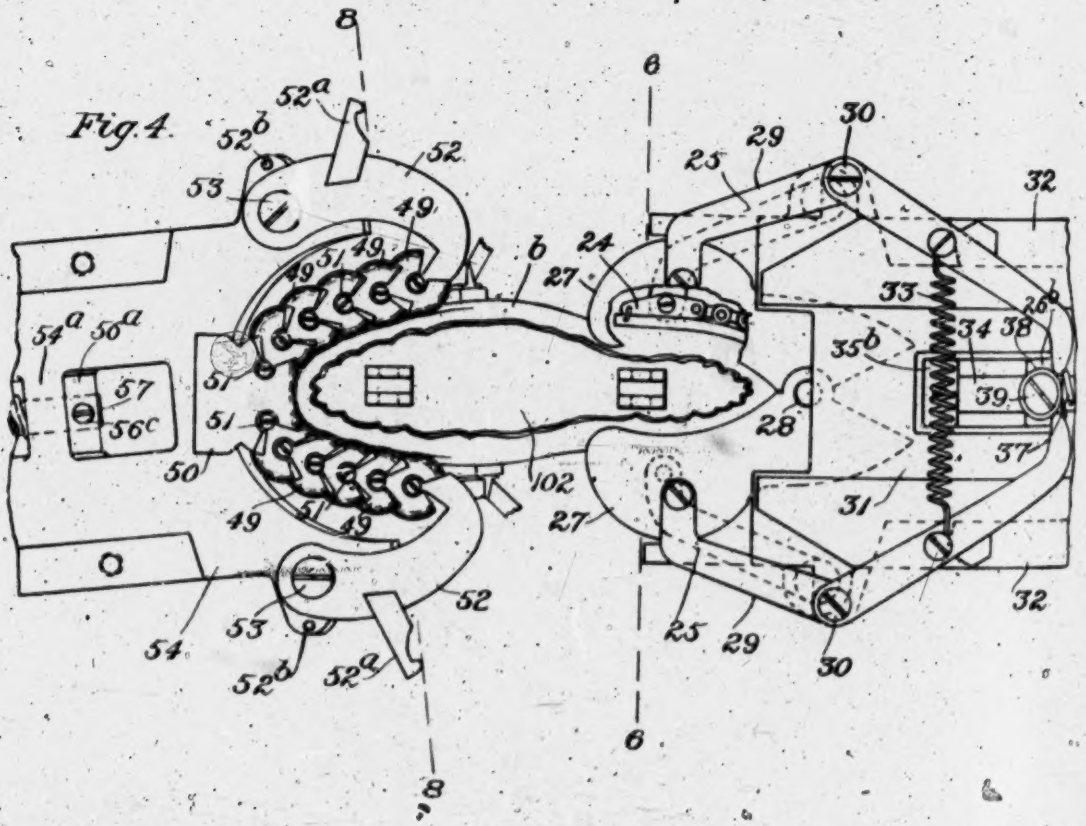


Fig. 4.



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LASTING MACHINE.

APPLICATION FILED APR. 28, 1913.

1,245,117.

Patented Oct. 30, 1917.

7 SHEETS—SHEET 2.

Fig. 2.

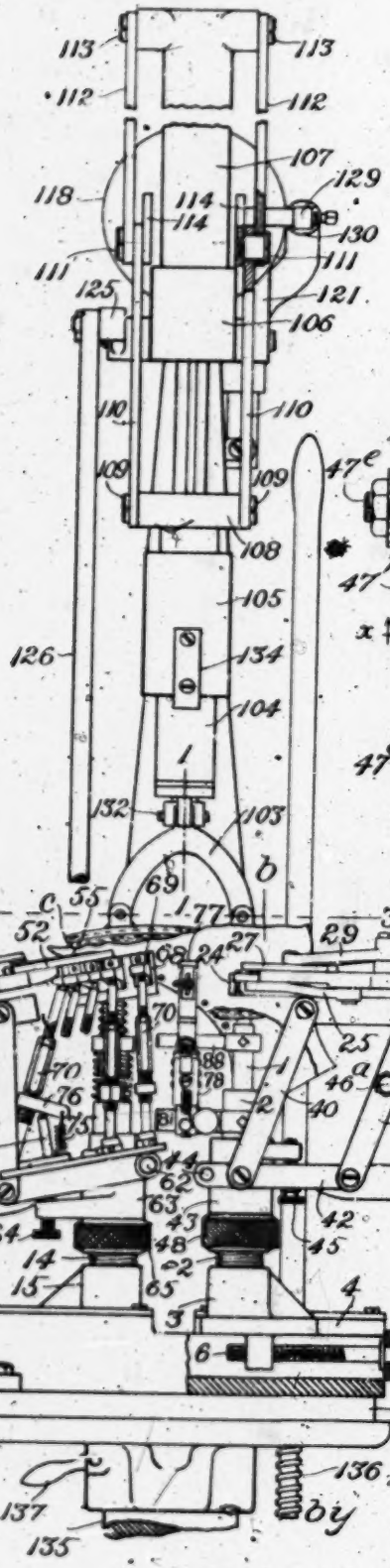


Fig. 2a

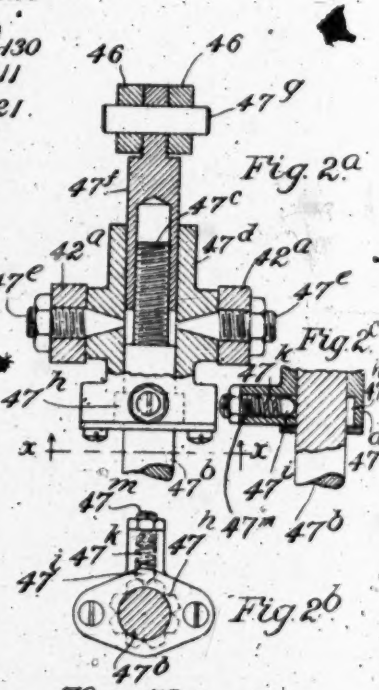
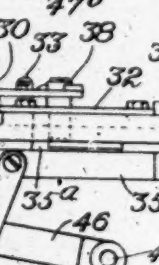


Fig. 2b



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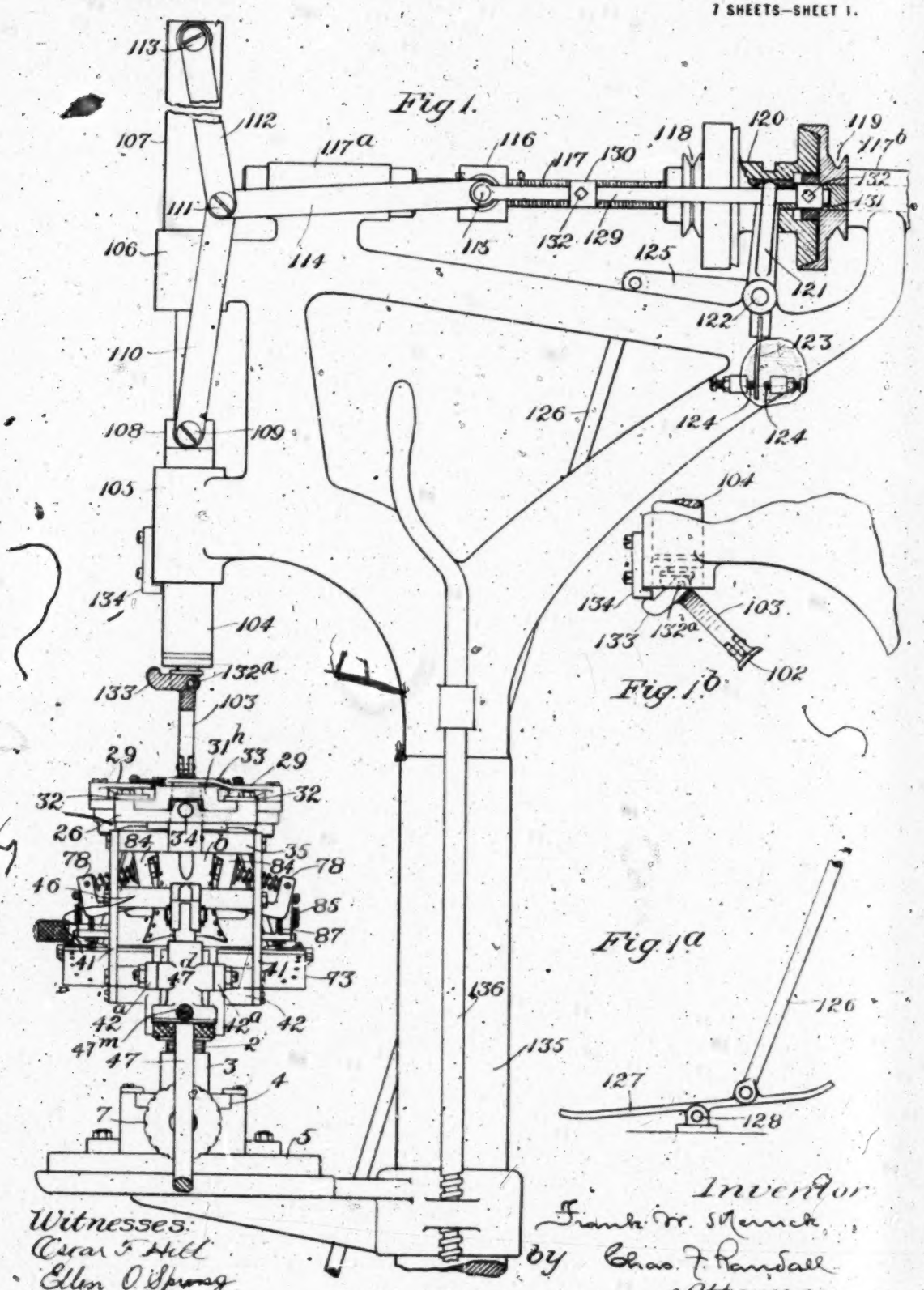
LASTING MACHINE.

APPLICATION FILED APR. 28, 1913.

1,245,117.

Patented Oct. 30, 1917.

7 SHEETS—SHEET 1.



UNITED STATES PATENT OFFICE.

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LASTING-MACHINE.

1,245,117. Specification of Letters Patent. Patented Oct. 30, 1917.

Application filed April 28, 1913. Serial No. 764,005.

To all whom it may concern:

Be it known that I, FRANK W. MERRICK, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Lasting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

An important characteristic of the machine herein shown and described is that the coming together or relative approach of the last and upper, or lasted shoe as it may be termed, and the lasting devices serves to bring about the wiping of the upper about the last, or in other words to actuate the lasting devices to wipe the upper about the last.

The actuation for the purposes of the relative approach is effected by power means of ample power in proportion to the weight of the parts to be actuated and to the resistance to be overcome in the performance of the work, such power means being fully sensitive to the control of the operator, and instantly responsive to his control so as to enable him to occasion the approach or promptly stop it at any instant, or as promptly reverse it. Consequently if, after the operator has set the mechanism at work to cause the lasted shoe and the lasting devices to come together, he should observe a wrinkle in the lining, a displacement of some part of the shoe, an improper adjustment or displacement of some part of the machine, or some other fault requiring attention before the lasting operation is proceeded with, he may instantly arrest the approach or coming together, and if necessary may reverse the action so as to ease up on the pressure between the shoe and the lasting devices or may reverse far enough to provide for separating the shoe from the lasting devices.

The invention includes various novel features, certain of which are embodied in the means aforesaid for occasioning and controlling the relative approach of the lasted shoe and the lasting devices, and others are embodied in and in connection with the lasting devices.

Convenient embodiments of the various features of the invention are illustrated in the drawing, in which latter,—

Figure 1 shows in side elevation, with certain small portions in section, a machine embodying the features of the invention, the lower portion of the supporting standard being omitted, and the section of the depresser or hold-down being on the line 1, 1, of Fig. 2.

Fig. 1ª shows the treadle, omitted from Fig. 1, through which the operator controls the relative approach aforesaid.

Fig. 1ᵇ is a detail view showing the depresser or hold-down in rearwardly retracted position.

Fig. 2, Sheet 2, shows the machine in front elevation, with certain small portions in section or partly broken away.

Fig. 2ª is a detail view partly in section and on an enlarged scale showing the construction and adjustment-provisions of one of the hand-levers for operating the heel and toe lasting devices.

Fig. 2ᵇ is a view in horizontal section on line x—x of Fig. 2ª, looking upward.

Fig. 2ᶜ is a detail view of the adjustment devices partly in vertical section.

Fig. 3, Sheet 3, is a plan view of certain parts below the dotted line 3, 3, Fig. 2.

Fig. 4, Sheet 3, is a plan view on an enlarged scale of certain of the parts which are shown in Fig. 3, representing them as closed together upon a shoe.

Fig. 5, Sheet 4, is a view in vertical section on line 5, 5, of Fig. 3, the last and shoe thereon being elevated relative to the heel-lasting devices, and the latter open.

Fig. 6, Sheet 4, is a view in vertical section on line 6, 6, of Fig. 4, the last and shoe being depressed within the heel-lasting devices, and the said devices closed together upon the shoe.

Fig. 7, Sheet 5, is a view in vertical section on line 7, 7, of Fig. 3, the last and shoe being elevated and the toe-lasting devices open.

Fig. 8, Sheet 5, is a view in section on line 8, 8, of Fig. 4, the last and shoe being depressed within the nest of lasting devices, and the said devices being closed together upon the shoe.

Fig. 9, Sheet 6, is a view of the heel-lasting devices and portions of a last and shoe, on an enlarged scale and with the holding-down gibs removed, the said devices being in open condition.

Fig. 10, Sheet 6, is a plan view of certain of the parts that are represented in Fig. 9,

with the heel wiper-plates, their carrying levers, and the carrying-plate for said levers, removed.

Fig. 11, Sheet 7, shows in front elevation the heel-pin, the supporting-post therefor, the waist or shank-lasting devices, and a last and portions of a shoe applied thereto, the last being elevated relative to the said lasting devices.

Fig. 12, Sheet 7, is a view looking from the left in Fig. 11, with the last and shoe thereon in vertical section.

Fig. 13, Sheet 7, is a view similar to Fig. 12 but showing the last and shoe depressed and the waist or shank-lasters closed together upon the shoe and last.

Fig. 14, Sheet 7, is a detail view, on an enlarged scale, of the means shown in Figs. 11 to 13 for keeping the waist or shank-lasters normally in a horizontal position.

Having reference to the drawings,—

In the various views in which the last and parts of a shoe are shown, the last is marked *a*, the upper *b*, and the insole *c*.

The last *a* is mounted in the machine upon a heel-pin 1, Figs. 2, 5, and 6, that is carried by a post 2 upon a slide or carriage 3, (Fig. 2,) mounted in guide-ways 4 upon a bed or platen 5, the said slide or carriage being adjustable upon the bed or platen in the direction of the length of the last, to suit the size of the last and shoe, by means of an adjusting screw 6 provided with a hand-wheel 7. The socket with which the last is provided to fit the upper end of the heel-pin, as in Figs. 5 and 6, is located at the approximate center of the curve of the back of the heel.

The heel-pin 1 is elastically mounted in order that it may have capacity for vertical movement. In the present instance, as shown in Figs. 5 and 6, it occupies a socket in the upper portion of the post 2, and is supported within the said socket by means of an expanding spiral spring 8. The said spring holds the heel-pin normally in its elevated position, the upward movement of the heel-pin under the action of the spring being limited by means of a stop-screw 9 applied to the upper end of the post 2. The inner end of the said stop-screw enters a longitudinal groove 10 formed in the heel-pin, and the engagement of the said inner end with the shoulder at the lower end of the said groove serves to determine the extent of the rise of the heel-pin and consequently fix the normal position of the latter.

A toe-rest is shown at 11, Figs. 7 and 8, Sheet 5, it having applied to its top a cushion 12 of leather or other material to avoid injury to the surface of the upper *b* which makes contact therewith. This toe-rest, like the heel-pin, is movable vertically and is elastically supported in an elevated normal position shown in Fig. 7. In this instance it is mounted with the lower portion of its stem within a sleeve 13, which in turn fits within a socket in the upper portion of a supporting post 14. The said post 14 is provided upon a slide or carrier 15, Fig. 2, mounted in guides at 16 upon the bed or platen 5, and by means of a screw and hand-wheel 17 made adjustable in the direction of the length of the last. The elastic support of the toe-rest is furnished partly by means of an endwise expanding spiral spring 18 that surrounds the stem of the toe-rest between a collar 19 fixed on said stem and the upper end of the sleeve 13, and partly by an endwise expanding spiral spring 20 which surrounds the sleeve between a shoulder at the upper end of the sleeve and the top of the post 14. The two springs coöperate in supporting the toe-rest in a manner which causes the latter to occupy normally its elevated position. A stop-screw 21 applied to the upper end of the socket in the post 14 projects through a slot 22 in the sleeve 13 into a longitudinal groove 23 in the stem of the toe-rest. This stop-screw serves to hold the sleeve and toe-rest from turning relative to the post, and also to limit the extent of the rising movement of the sleeve and toe-rest through engagement with the bottom of the slot 22 and with the shoulder which is formed at the lower end of the groove 23. In some cases I dispense with the toe-rest.

A last with shoe thereon applied to the heel-pin and toe-rest is supported thereby normally in elevated position relative to the lasting devices somewhat above the position that is indicated in Figs. 5 and 7. The spring-mountings of the heel-pin and toe-rest permit the last and shoe to be depressed within the circle of the lasting devices.

The toe-rest is caused to occupy a position in line vertically with the approximate center of the curve of the toe of the last.

The heel-lasting devices comprise in the present instance a heel-band and heel-wipers or crimping plates.

The heel-band 24, as shown more particularly in Fig. 4, Sheet 3, and Figs. 9 and 10, Sheet 6, is of well-known construction, and is mounted by means of swinging supporting arms 25, 25, upon the heel-band carrying plate 26, the said arms being pivoted to the said plate at 25^a, 25^a, Fig. 10.

The heel-wipers or crimping plates 27, 27, Figs. 3, 4, and 9, are of well-known character, they being pivotally connected together at 28 and pivotally mounted upon actuating levers 29, 29, which are pivoted at 30, 30, upon the heel-wiper carrying plate 31, Fig. 9. The latter plate rests upon the heel-band carrying-plate 26 and is held in place thereon by means of removable gibs 32, 32, Figs. 3 and 4, in manner providing

for independent sliding movement of the heel-wiper plate 31 upon and with relation to the heel-band plate 26. The heel-wipers 27, 27, are held normally open or expanded as in Figs. 3 and 9 by means of a contracting spiral spring 33 connecting together the tail-portions of the wiper-actuating levers 29, 29.

To enable the heel-lasting devices to be swung or tipped bodily transversely, to suit or conform to the twist of the last, the plate 26 is mounted upon a longitudinal pin 34 carried by a carrier 35. The said pin 34 is mounted in lugs 35^a, 35^b, rising from said carrier, and entering openings 26^a, 26^a, in the plate 26, and is fixedly held in the lug 35^b by means of a clamping-screw 36. The plate 26 is mounted upon the said pin 34 by means of bearings at 26^b, 26^b, so that it is free to rock or swing or tip transversely.

For the purpose of enabling the heel-band and the wiper-plates 27, 27, to be caused to act upon the heel-portion of the shoe, the carrier 35 is movable lengthwise toward and from the heel-end of the last, and it is engaged with the two plates 26 and 31 in manner to actuate the latter in the same directions. In order that when the carrier, 35 is moved toward the heel of the last the heel-band may be pressed yieldingly against the heel-portion of the upper on the last outside the counter of the shoe, an endwise expanding spiral spring cushion 37 is mounted on the pin 34 between one of the bearing-portions 26^b of plate 26 and the lug 35^a of the carrier 35. This spring acts to hold heel-band plates 26 longitudinally inward relative to the carrier 35 and heel-wiper carrying plate 31, with the inner bearing 26^b of plate 26 in contact with lug 35^b of the carrier 35. In the ingoing movement of the carrier 35 the said spring transmits pressure from the lug 35^a to the heel-band-plate 26 so that plate 26 moves in unison with said carrier until the heel-band brings up firmly around the heel-portions of the upper and last outside the counter of the shoe, and then the spring compresses during the remainder of the inward movement of the carrier, its tension continuing to hold the heel-band in close engagement with the heel-portions of the upper and last.

The lug 35^a of the carrier 35 also serves to actuate the heel-wiper plate 31 in a positive manner. To this end the said plate 31 is formed with a slot 31^a, Fig. 9, between transverse bridging portions 31^b, 31^b. The lug 35^a enters the said slot, and by engagement with the said bridging portions causes the heel-wiper plate 31 and heel-wipers, 27, 27, to accompany the carrier 35 in the longitudinal movements of the latter.

The heel-wipers 27, 27, are caused to swing toward each other during the longitudinal inward movement of the carrier and the plates 26, 31, through the engagement of the tail-portions of the wiper-actuating levers 29, 29, with a roll 38 mounted upon a screw-stud 39 carried by the inner bearing-portion 26^b of heel-band plate 26. The said tail-portions overlap each other at the outer side of the said roll 38. The normal relations are as in Figs. 3 and 9. During the movement of the heel-band plate 26 and the wiper-carrying plate 31 inward in unison while the spring 37 holds the said inner bearing-portion 26^b of plate 26 in engagement with lug 35^b of the carrier 35, the spring 33, Fig. 9, holds the tail-portions of the wiper-carrying levers 29, 29, in engagement with the roll 38, with the wipers 27, 27, in their fully opened condition. When, however, the inward movement of the heel-band is arrested through contact with the last and shoe at the heel, so that the inward movement of its carrying-plate 26 ceases, the roll 38 remains stationary while the continued inward movement of the heel-wiper carrying plate 31 causes the tail-portions of the heel-wiper actuating levers 29, 29, to draw past the said roll 38 as in Fig. 4. The said tail-portions are curved at their extremities which make contact with the roll, and consequently in this continued inward movement of the heel-wiper plate 31 and heel-wipers the levers 29, 29, are caused to turn on their pivots 30, 30, and thereby close the heel-wipers 27, 27, toward each other. Fig. 4 shows the heel-wipers in their fully closed positions. In the subsequent outgoing movement of the carrier 35 the compressed spring 37 at first, through its tendency to expand, holds the heel-band pressed against the heel-portions of the upper and last. Meanwhile the movement of the heel-wiper carrying plate 31 in unison with said carrier carries the levers 29, 29, in the same direction relative to the roll 38 and relieves their pressure against the latter, so that the spring 33 is permitted to act to operate the said levers to open the heel-wipers apart from each other. The lug 35^b of carrier 35 then engages with the adjacent bearing 26^b and acts positively to cause plate 26 to accompany the carrier for the remainder of the outgoing movement of the latter.

The carrier 35 of the heel-lasting devices is movably mounted so as to be capable of inward and outward movement in the direction of the length of the last, and also of up and down movement. This capacity is secured by supporting the carrier 35 by means of pairs of parallel links 40, 41, upon a mounting 42 in connection with the slide or carrier 3 for the heel-pin. These parallel links cause the carrier 35 to remain parallel with its primary position throughout its entire range of movement. To provide for adjustment of the heel-lasting devices to suit the spring of the heel-portion of the last,

the mounting 42 is constructed and supported in manner providing for adjustment of the carrier 35 into a horizontal position or into one at any desired inclination longitudinally. In the present instance, the mounting 42 is made U-shaped to extend on opposite sides of a sleeve 43, Figs. 2, 5, and 6, mounted upon the post 2. The side-arms of the said mounting are connected pivotally at 44, Fig. 2, with the said sleeve 43 so that the mounting 42 is capable of swinging movement vertically. It is adjusted into the required position with reference to the horizontal by means of an adjusting-screw 45, Fig. 2. The adjustment of the mounting by means of the said adjusting screw results in a corresponding adjustment of the carrier 35 and the heel-lasting devices. The parallel links 40, 41, insure movement of the lasting devices toward and from the last always in parallelism, so that after the carrier has been adjusted into a horizontal or inclined position corresponding with the spring of the heel-portion of the last, the movement of the lasting devices toward the last shall always cause such devices to act in a plane parallel to the general plane of the upper surface of the last and insole at and adjacent the heel.

The pivots connecting the parallel links 40, 41, with the mounting 42 and the carrier 35 are so related to the inward limit of the inward movement of the lasting devices that during the final portion of the wiping action, and after the margin of the upper has been wiped inward and crimped, the wipers shall move downward or descend more or less gradually upon the portions of said margins that are engaged thereby, so as to press such portions more forcibly and more directly against the bottom of the insole, thereby applying a gradually increasing pressure at the same time that they perform the regular wiping and crimping action. This produces a tendency to break down and set the leather snugly against the insole.

For the convenient actuation of the carrier 35 of the heel-lasting devices, enabling such devices to be moved outward away from the position of the last and inward again into position to perform the preliminary wiping operation, as well as for the purpose of enabling the said carrier to be actuated by the workman to cause the said lasting devices to effect the final wiping and crimping action, the pair of parallel links 41 is connected by a yoke-shaped connecting member or link 46, Figs. 2, 5, and 6, with the upper arm of a hand-lever 47 which is pivoted upon and between outward extensions 42^a, 42^a, of the mounting 42. By swinging movement of this hand-lever the workman is able to move the carrier 35 and heel-lasting devices inward into position for the said preliminary operation, and subsequently apply force to occasion the final wiping and crimping action and exert the direct pressure to break down and set the wiped-over and crimped portions of the upper. The relative proportions or lengths of the link 46 and the upper arm of the hand-lever 47, and the relations to one another of the pivots connecting said link to the links 41 and to the upper arm of the hand-lever, and the pivot supporting the said hand-lever upon the mounting, are such that the link 46 and the upper arm of the hand-lever constitute toggle-members and operate with a toggle-action and with progressively-increasing power in moving the heel-lasting devices inward with relation to the heel of the last. The final portion of the swing of the hand-lever to occasion such inward movement carries the pivotal connection 47^a between the link 46 and the upper arm of the hand-lever into line with the pivotal connection 46^a of link 46 with links 41 and the pivotal connection 47^c of the hand-lever with the extensions or arms 42^a of the mounting 42, this serving to exert the final powerful pressure and to lock the carrier in its inward position, maintaining the pressure of the wipers upon the crimped-over portions of leather.

For the purpose of enabling the range of the inward movement of the heel-lasting devices to be varied at will, the length of the toggle-member constituted by the upper arm of the hand-lever 47 is made adjustable. Referring more particularly to Figs. 2 and 2^a, the hand-lever is formed in three parts. The first of these is a handle-portion 47^a having an upwardly extended spindle-portion 47^b, the extremity 47^c of which is reduced and screw-threaded. The second is a hub-portion 47^d, which receives the said spindle, this hub-portion being mounted upon cone centers 47^e, 47^e, carried by the extensions or arms 42^a, 42^a, of the mounting 42. The third is an adjustable connecting member 47^f, which has its lower portion entered into the bore of the hub-portion 47^d and internally socketed and screw-threaded to receive and engage with the screw-threaded upper extremity 47^c of the spindle 47^b. The upper portion of this connecting-member 47^f is flattened and fitted between opposite lugs of the link 46, it being connected with the said lugs by means of a pivot 47^g. The handle-portion 47^a may be rotated by the workman, in which case the spindle 47^b will turn within the bore of the hub-portion, and when the handle-portion is rotated the screw-threaded connection between the spindle 47^b and the connecting-member 47^f operates to adjust the said piece 47^f in or out of the hub-member 47^d so as to decrease or increase the effective length of the upper arm of the hand-lever. Any convenient

means may be provided for insuring against accidental rotation of the handle-portion 47^a. In the present instance, a notched wheel or collar 47^b, shown in dotted lines in Figs. 2^a and 2^b, is provided upon the spindle-portion 47^a, and in a radial hole in the lower portion of the hub 47^d a ball 47^f, shown best in Fig. 2^c, is placed, the said ball being backed up by an endwise expanding spiral spring 47^g, the tension of which is adjusted by means of an adjusting screw 47^m. The engagement of the said ball in one of the notches of the wheel or collar 47^b operates to resist any tendency of the handle-portion 47^a to rotate accidentally, but the exertion of sufficient force by the workman will enable the said handle-portion to be rotated to the extent required.

The sleeve 43 by which the mounting 42 is supported is itself afforded vertical support by a collar 48 upon the post 2. The sleeve is revoluble upon the portion of the said post above the said collar, so that the heel-lasting devices may be swung transversely around the said post, and consequently around the axis of the heel-pin, into any position required to suit the swing of the last.

The position of the heel-lasting devices is made adjustable vertically by vertical adjustment of the collar 48 upon the post 2. This adjustment is provided for in the present instance by internally threading the said collar, as in Figs. 5 and 6, and fitting it to a screw-threaded portion of the post. The knurled exterior of the collar enables the collar to be readily turned by hand in making this adjustment.

The general construction and arrangement for supporting, adjusting, and operating the heel-wiper or crimping-plates is applicable also in connection with toe-wiper or crimping devices, and I have shown a substantially similar construction and arrangement applied in the latter connection. I may employ in practice any usual or preferred form and construction of toe-wiper or crimping devices, as, for instance, wiper-plates more or less closely approximating in character, construction, and means and mode of operation, the heel-wiper or crimping-plates 27, 27. I have shown, however, a form of toe-wiping and crimping devices which I prefer and embodying certain features of invention.

Referring now to the preferred construction of toe-wiper and crimping devices, and viewing more particularly Figs. 3 and 4, the immediate wiping or crimping agent is a flexible chain composed of a series of links 49, 50, 49, connected together by pivots 51 so as to be capable of free play or flexure in the plane of the chain. The end links also are engaged by pivots with two supporting arms 52, 52, which are mounted pivotally at 53, 53, upon the toe-wiper carrying plate 54 at opposite sides of the latter. The intermediate link 50 is larger than those at either side of it, and its back-portion rests upon the plate 54 so that the middle portion of the chain is thereby afforded vertical support. The chain is disposed in the form of a U-shaped bend, and normally is held expanded widthwise through the action of contracting springs 55, 55, which are engaged with projections 52^a, 52^a, from the arms 52, 52, and tend to move the arms away from each other, the extent of the separating movement being limited by means of stop-pins 52^b, 52^b, upon the plate 54. The arms 52, 52, rest upon extensions of the toe-wiper carrying plate 54 and are supported thereby against downwardly acting pressure. A cover plate 55 removably held in place upon plate 54 by detachable gibs 56^x, 56^x, projects over the middle link 50 and some of the side-links adjacent the arms 52, 52, and thereby holds the toe-wiper and crimping-chain downward against upwardly-acting pressure tending to force the chain upward.

The toe-wiper and crimping chain is a floating flexible device which accommodates itself to the shape and position of the toe-portion of the last. In other words, it conforms automatically to the shape and swing of the said toe-portion. Each of the links 49 thereof has a radial V-shaped notch, and an opposite radial V-shaped arm to occupy the notch of the next adjacent link, the said arm having an extension which overlaps the central portion of the latter link and occupies a counterbore therein as in Fig. 8, and the said extension and the said central portion having holes therein which receive the connecting pivot 51. The said pivot is a screw-pivot having the thread located on the lower portion of its stem to engage an internal thread of the central hole of the second link, a plain portion of the said stem being fitted within the hole in the overlapping extension of the first link. The outer and inner edges of the links are curved concentrically with respect to the centers of the pivots 51, as shown in Fig. 4, and inwardly concave-edged lateral portions of one link fit outside the curved convex edge-portions of the next link, so that the links overlap and work upon one another in the same plane without any opening or crack at the inner edge of the chain into which the upper can enter so as to be pinched and cut. The inner edges of the segments are rounded vertically so as to obviate injury to the upper leather by scraping or scratching the same during the wiping and crimping action. The supporting arms 52, 52, are connected with the terminal

links 49, 49 by means of V-shaped projections and pivots, the said projections occupying V-shaped notches in the said terminal links. The connection between the large intermediate link 50 and the links 49, 49, next adjacent the same is effected by means of the V-shaped arms of the latter links occupying V-shaped notches at the opposite ends of the link 50, the said arms being engaged with the link 50 by pivots 51, 51, as shown.

The toe-wiper carrying plate 54 and the cover-plate 55 are mounted upon a carrier 56 by means of a longitudinal pin 57, upon which the plate 54 and parts carried by it are capable of rocking or tilting transversely to conform to the twist of the forepart of the last. The said pin is mounted in lugs 56ª, 56ᵇ, on the carrier 56, and the plate 54 is furnished with bearings 54ª, 54ᵇ, adapted to turn and slide on the said pin. The pin is fixed in the lug 56ª by means of a clamping screw 56ᶜ. Between the inner bearing, 54ª of plate 54, and the outer lug, 56ᵇ, of the carrier 56 the pin is surrounded by an endwise expanding spiral spring 58. This spring normally holds the toe-wiper carrying plate 54 pressed inwardly relatively to the carrier 56, with the bearing portion 54ª pressed against the lug 56ª. When the carrier is moved longitudinally inward toward the toe of the last the toe-wiper plate moves in unison therewith until the working edge of the toe-wiper chain comes into contact with the upper around the toe-portion of the last. The spring 58 yields under continued inward movement of the carrier and its tension holds the chain pressed against the upper.

The carrier 56 of the toe-wiper devices is combined by means of pairs of parallel links 59, 60, with a mounting 61 that is pivoted at 62 to a sleeve 63 surrounding the upper portion of the post 14. The said sleeve is adapted to turn around the said post to enable the toe-wiper devices to be swung transversely in an arc concentric with the curve of the end of the toe of the last. This swinging movement, as will be apparent, is to enable the toe-wiper devices to be positioned properly to suit the swing of the forepart of the last.

To enable the plane of the toe-wiper devices to be adjusted with reference to the horizontal to suit the spring of the forepart of the last, the adjusting-screw 64 is applied to an arm extending out from sleeve 63, the said adjusting-screw engaging with the mounting 61 and serving to give the said mounting, the carrier 56, and the toe-wiper devices a greater or less degree of inclination. The internally threaded collar 65 fitted upon the screw-threaded lower portion of the post 14, and upon which the sleeve 63 rests vertically, provides for adjustment of the toe-wiper devices bodily up or down vertically to suit the last employed.

The longitudinal movement of the carrier 56 and the toe-wiper devices thereon toward and from the toe-portion of the last is provided for by means of a hand-lever 66 corresponding with the hand-lever 47 of the heel-lasting devices, and a link 67 connecting the upper arm of the said hand-lever 66 with the carrier 56. The mode of operation and means of adjustment in the case of the hand-lever 66 are the same as in the case of the hand-lever 47.

For the purpose of drawing the vamp snugly against the under portion of the last and causing it to fit against the surface of the said portion, any well-known or approved girth-device or vamp-stretcher device may be employed. I have shown a form of wiper-device comprising a wide band 68, Figs. 2, 7 and 8, of leather having its width disposed vertically, the said band being held in U-shape to extend horizontally about the fore-part of the last, and supported in a working position just below the toe-wiper and crimping chain 49, 50. For the support of the vamp-wiper band 68 small brackets 69, 69, are fastened to its outer side, these brackets having downturned sockets which receive the ball-shaped upper ends of posts 70, 70, having their ball-shaped lower ends entered into sockets in stands 71, 71, fastened by screws 72, 72, to a plate 73 on the mounting 61. Thereby the vamp-wiper band 68 is supported upon the mounting 61. In order to provide for adjustment of the height of the vamp-wiper band 68, or of different portions thereof, the posts 70, 70, are made adjustable in length. In this instance the adjustability is secured by making each post in two portions; namely, a lower portion having an internally threaded socket in its upper part, and an externally threaded upper portion screwing into the said socket and provided with a lock-nut 70ª to prevent loss of adjustment. The posts 70, 70, at the ends of the band 68 are mounted upon the mounting 61 immediately above the pivotal axis on which the said mounting swings vertically. Consequently the said ends are not raised or lowered when the mounting is swung up or down. But when the mounting occupies its downwardly inclined position shown in Fig. 2, the band 68 as a whole occupies an outwardly and downwardly inclined position, its bend or bight being lowest. Consequently, after the last with a shoe thereon has been placed in position within the nest of lasting devices and has been pushed down within the vamp-band, if then the mounting 61 is swung upward from its inclined position in Fig. 2, the bend or bight of the

vamp-band 68 will swing upward about the toe-portion of the last, pivoting about the tops of the posts at the ends of such band, thereby wiping the toe-portion of the vamp upward.

Referring more particularly to Figs. 7 and 8, the posts 70, 70, which are in line transversely with the stem of the toe-rest have inwardly extending arms 73, 73, mounted thereon, the said arms being connected by links 74, 74, to the upper end of the sleeve 13 surrounding the said stem. As has been described, the sleeve 13 normally is held in an elevated position by means of the spring 20. When the sleeve is elevated it acts through the described connections to hold the said posts outward and the sides of the vamp-wiper band 68 apart from each other. When the toe-rest is pressed down, compressing the spring 18 which rests upon the upper end of the sleeve 13 and thereby forcing the sleeve 13 down against the resistance of the spring 20, the downward movement which is transmitted from such sleeve through the links 74, 74, to the arms 73, 73, operates to swing the upper ends of the said posts inward, and the sides of the vamp-wiper band 68 toward and against the opposite sides of the upper surrounding the last for the desired wiping engagement therewith. Arms 73, 73, are made adjustable vertically upon the posts 70, 70, to which such arms are attached, to vary the extent to which the said posts are swung outward and the opposite side-portions of the vamp-band spread apart by the rise of sleeve 13. Also to vary the effect in pressing the side-portions of the vamp-wiper band 68 toward each other when the toe-rest is pressed downward. This adjustability is secured by forming an external screw-thread upon the lower portion of each post 70, and internally threading the holes in the arms 73 into which the posts fit. By turning the posts within said holes the arms are screwed up or down as required.

The remaining posts 70, 70, respectively are swung inward toward the vertical axis of the toe-rest by means of contracting spiral springs 75, Fig. 2, which are engaged with inwardly-projecting arms 76 upon the said posts, such arms corresponding with the arms 73 and being vertically adjustable upon the posts in the same manner as arms 73. The tension of the springs 75 operates to draw the said posts inward until the arms 76 make contact with stop-pins 76ª upon mounting 61. The said stop-pins determine the normal positions of such posts and of the corresponding portions of the vamp-wiper band 68. Such positions may be varied by vertical adjustment of the stop-pins, or by adjustment of the arms 76, 76, up or down upon the posts. This latter adjustment also varies the tension of the springs 75. By proper manipulation, the normal positions may be adjusted without varying the tension, and vice versa.

As a further means of enabling the wiping efficiency of the vamp-wiper band 68 to be varied, the stands 71, 71, Figs. 7 and 8, are made adjustable radially so that the posts 70, 70, may be set in positions more or less approximating vertical positions, or more or less inclining downwardly and outwardly from the vertical. For this adjustment the said stands 71 are slotted at 71ª, 71ª, to receive the stems of the screws 72, 72, the slots permitting the stands to be shifted radially as aforesaid. Referring to Figs. 7 and 8 as representing the inclination aforesaid of the posts, and it being assumed that as the last with shoe thereon is moved downward from its elevated position in Fig. 7, thereby depressing the toe-rest, the vamp-wiper band 68 will be closed inward against the upper at the sides of the last and around the toe-portion of the last, it will be understood that there will be friction between the vamp-wiper band and the upper. This friction will tend to carry the vamp-wiper band downward with the last and shoe. Any downward pressure upon the vamp-wiper band in Fig. 8 will naturally tend to cause the upper ends of the posts 70, 70, to swing downward and inward so as to approach each other more closely. Consequently, with the supporting posts 70, 70, set at converging inclinations as in Fig. 8, the frictional engagement between the upper and the vamp-wiper band, operating as aforesaid with a tendency to move the vamp-wiper band downward, will itself tend to cause the vamp-wiper band to press more firmly against the upper and toward the surface of the last and hence will correspondingly increase the wiping efficiency of the band. The greater the inclination of the posts, the more powerful will be the action; the more nearly vertical the posts, the less powerful will it be.

As a convenient means of preventing accidental displacement of the arms 73, 76, upon the threaded portions of the posts 70, 70, the internally threaded socket-portion of each of the said arms may be slitted vertically, and have a tightening bolt 73ª combined with the portions at opposite sides of the slit to enable them to be drawn together so as to cause the internally threaded socket to bind upon the externally threaded portion of the post.

Waist-lasting devices embodying features of the invention are shown in place in the machine in Fig. 2, and separately in detail in Figs. 11, 12, 13 and 14 of Sheet 7. The said devices comprise opposite waist-wipers 77, 77, disposed in proper relation to the waist-portion of the last, and swinging carriers 78, 78, for the said wipers. The waist-

wipers extend upwardly from the carriers, which are pivoted at 79, 79, upon a mounting 80 supported by a pin 81 extending from a collar 82 secured by a clamping-screw 83 upon the post 2 above the sleeve 43. The said mounting is adjustable along the pin 81, toward and from the heel-pin 1. The pivots 79, 79, are located at points at the front and rear sides, respectively, of the last. The waist-wipers 77, are carried by supports 84, 84, that rise from the carriers 78, 78, intermediate the position of the last and the pivots 79, 79. Contracting spiral springs 85, 85, connecting with the supports 78, 78, and with pins 86, 86, projecting from the mounting 80 operate to hold the carriers 78, 78, normally in the positions occupied by them in Fig. 12; namely, in engagement with adjustable stops 87, 87, projecting from said pins 86, 86, and with the wipers elevated. As thus elevated the said wipers are separated a distance greater than the width of a last.

For the purpose of causing the waist-wipers 77, 77, to close together against the opposite sides of the last so as to engage with the waist-portions of the upper surrounding the last and wipe the same upwardly, tightly and smoothly around the waist-portion of the last, the carriers 78, 78, are provided with inward extensions which cross below an actuating pin 88 carried by a collar 89 that is adjustably fixed at the required height upon the heel-pin 1 by means of a clamping-screw 90. At the proper point in the descent of the last with the upper thereon, the pin 88 strikes the crossing portions of the supports 78, 78, such portions being in its path, and by pressing such portions down it operates to swing the carriers 78, 78, upon their pivots 79, 79. This action operates in turn to swing the waist-wipers 77, 77, toward each other so as to close against the opposite sides of the last at its waist. By reason of the fact that the pin 88 engages with the extensions of the carriers 78, 78, at a greater distance horizontally from the pivots 79, 79, than the pivots 91, 91, connecting the supports 84, 84, of the waist-wipers 77, 77, with carriers 78, 78, it follows that although the downward swinging movement of the wiper-carriers 78, 78, causes the waist-wipers 77, 77, to move downward simultaneously with the last, the said wipers move downward a less distance than the last and at a slower rate of speed. Consequently, the net result is that the last descends between the waist-wipers faster than the latter descend, so that as a result of the differential movement the waist-wipers act to wipe the waist-portions of the upper upwardly about the waist-portion of the last.

In order that the movement of the waist-wipers 77, 77, downward and toward the last may occasion a yielding pressure of the said wipers against the upper, the supports 84, 84, of the wipers are pivoted as at 91, 91, to the carriers 78, 78, and are backed up by endwise expanding springs 92, 92. These springs are mounted upon pins 93, 93, which are pivoted by their outer ends at 94, 94, to upturned portions of the carriers 78. The screw-threaded inner ends of the said pins pass through holes in the pivoted supports 84, 84, and are furnished with stop-nuts 95, 95, to limit the extent of the inward movement of the said pivoted supports under the action of the springs 92, 92. The said springs surround the pins 93, 93, between the pivoted supports 84, 84, and the said upturned portions of the carriers 78, 78.

In order that the waist-wipers 77, 77, may conform to the direction of the sides of the last at the waist, they are mounted with capacity to swivel transversely. To this end the little stands 96, 96, to which the said wipers are attached are connected with the pivoted supports 84, 84, by means of pintles at their lower ends fitting sockets in the pivoted supports 84, 84. This mode of mounting the wipers upon the pivoted supports enables them to swivel in a horizontal direction. The shanks of the waist-wipers 77, 77, are slotted lengthwise at 97, Fig. 11, for the passage of the stems of the bolts 98, 98, which attach the wipers to the stands 96, 96. This permits an adjustment of the said wipers up and down upon their carrying means.

The mounting 80 for the waist-lasting devices is caused to tend to remain normally in horizontal position, but is adapted to be swung vertically in either direction when required, as for instance to enable the relative position of the waist-wipers 77, 77, to conform to the differences between right and left lasts respectively. A simple arrangement for causing the mounting 80 to remain normally in horizontal position while permitting it to be swung with slight effort is shown in Figs. 11 to 14. In these views the supporting pin 81 is formed with a longitudinal V-shaped groove 81ª, Fig. 14, in one side thereof and within a socket in a portion of the carrier 80 is contained a conically pointed pin 99. This pin is capable of sliding lengthwise within the said socket, its headed end being acted upon by an expanding spiral spring 100 which presses the pin endwise so that the tip of its conical point shall enter and remain in the V-groove 81. While the tip of the pin is held in the V-groove, the effect is to cause the carrier to remain normally in its horizontal position, but upon the application of sufficient force to the parts tending to swing the carrier vertically in one direction or the other the inclination of the side of the groove 81 against which the tip of the pin

99 will be carried by the swinging movement will press the pin back endwise against the resistance of the spring, allowing the carrier to be rocked. If the swinging movement of the carrier is not great enough to shift the point of the pin 99 entirely out of the V-groove 81ª, the carrier will be returned automatically to its normal position when free to do so. In order to enable the carrier to be locked positively in its normal position when desired, a screw-threaded pin 101 has its threaded portion fitted to the internally threaded portion of the socket in the carrier 80. A prolongation of the said screw-threaded pin passes through the center of the spring 100, and when the screw-threaded pin is screwed inward within the socket, the end of this reduced prolongation presses against the head of the pin 99 so as to force the point of pin 99 fully home into the V-groove 81ª in the supporting-pin 81. To facilitate the turning of the screw-threaded pin 101 for the purpose just explained its projecting outer end is knurled to enable a better grasp of the same to be had by the workman.

The normal position of the heel-pin and toe-rest, elevated above the nest or circle of lasting devices, facilitates the application thereto of a last with shoe upper, etc., thereon. When first applied the last and shoe stand up more or less above the lasting devices, in full view and sufficiently clear of such devices to enable the operator to adjust the upper or lining or otherwise prepare for the lasting. While the last and shoe are thus relatively elevated, the carrier 35 of the heel-lasting devices may be shifted by hand toward the last so as to place the said devices in working relations with respect to the heel-portion of the shoe; that is to say, against or close to the upper around the smaller portion of the last below the swell or enlargement of the heel. In like manner, the carrier 56 of the toe-lasting devices may be shifted by hand toward the last so as to place the latter devices in working relations with the toe-portion of the shoe; that is to say, somewhat in under the overhanging, side-portions and toe-portion of the forepart of the last.

For the purposes of the lasting operations the last and shoe are depressed within the nest or circle of the lasting devices, so as to cause the latter to wipe the different portions of the upper upward smoothly about the last. I provide for the purpose a device which constitutes both a depressor and a hold-down. In addition to forcing the last and shoe down within the nest or circle of the lasting devices, as aforesaid, for the purpose of effecting the preliminary wiping operation, it serves to hold the last and shoe down while the final operations are being performed.

The depressor or hold-down 102 is connected by means of a yoke 103, Figs. 1 and 2, with the lower end of an upright plunger-rod 104 which slides in fixed guides 105, 106, in connection with the upper portion of the machine frame-work. The upper portion of the said plunger-rod working in the fixed guide 106 is of reduced diameter and enters an upward extension 107 of said guide. The plunger-rod and the presser or hold-down may if desired be arranged to be actuated by the power of the workman, conveniently applied, but preferably I utilize mechanical power applied at the will of the workman. To this end a block 108 is mounted upon the lower portion of the reduced part of the plunger-rod, the said block resting against the shoulder at the top of the large lower portion of the plunger-rod, and to the opposite sides of this block are connected by pivots 109, 109, the lower ends of the lower links or members 110, 110, of a pair of actuating toggles. The upper ends of the said links or members 110, 110, are connected by pivots 111, 111, to the lower ends of an upper pair of toggle-links or members 112, 112, the upper ends of which in turn are connected by pivots 113, 113, to the upper end of the extension 107 of the guide 106 for the plunger-rod. For the actuation of the toggles, the intermediate pivots 111, 111, thereof are connected by links 114, 114, to pivots 115, 115, at opposite sides of a traveler nut 116, on an actuating screw 117. The said screw is suitably journaled in bearings 117ª, 117ᵇ, in the upper part of the machine frame and is provided with means for rotating it in either direction so as to operate the traveler-nut and toggles as required for the purpose of moving the depressor or hold-down down or raising it.

The duplication of the toggles at opposite sides of the plunger-rod, and the connection of the respective toggles to the respective sides of the traveler-nut, are designed to secure balanced action and to avoid tendency to turning of the plunger-rod and depressor or hold-down, and cramping of the actuating connections.

For the convenient actuation of the screw 117 by power, I provide, preferably, a reversible drive mechanism, which in this latter instance is of a well-known type, it comprising pulleys 118, 119, grooved for the reception of driving bands and mounted to turn loosely upon the plain portion of the shaft of the said screw beyond the screw-thread. The said pulleys are in practice driven in opposite directions by a straight driving-band and a crossed one, respectively. Gear-wheels loosely mounted upon the screw-shaft and driven in opposite directions by connecting gearing might be employed instead, as sometimes in practice. Upon the

screw-shaft between the two rotating loose wheels 118, 119, is mounted a clutch-member 120 adapted to engage with either of the said wheels. The said clutch-member is splined to the screw-shaft, as usual, to cause it to turn in unison with the latter, while permitting it to be slid lengthwise thereon. Preferably, the coöperating portions of the loose wheels and the intermediate clutch-member are arranged to act by frictional engagement with each other, and in this instance are reversely cone-shaped as shown in Fig. 1, the sliding clutch-member being formed as a double cone, and the loose rotating wheels being cupped out to receive the engaging portions of the said sliding clutch-member. Other forms of frictional engagement may be utilized, or a positive clutch arrangement may be substituted.

The shifter or controller 121 for the movable clutch-member 120 is mounted pivotally at 122 upon the machine-frame. It is held normally in an intermediate position, with said clutch-member in a neutral position out of engagement with both wheels 118, 119, through the action of a leaf-spring 123. The said spring is carried by the clutch-shifter or controller, its free end being entered between contacts or abutments 124, 124, on the machine-frame. Movement of the clutch-shifter or controller to cause the shifting clutch-member to engage one or the other of the rotating wheels carries the spring against one or the other of the contacts or abutments. Thereby, the spring is bent, and thus it is placed under tension. When the clutch-shifter or controller is left free by the workman, the tendency of the spring to resume its normal form causes it, by pressure against such contact or abutment, to restore the shifting clutch-member to its normal intermediate position.

For the convenient manual control of the clutch-shifter or controller, an arm 125 thereof is connected by a rod 126 to a treadle 127, Fig. 1[a]. The pivotal mounting 128 of the said treadle is located at an intermediate point in the length of the treadle, so that by rocking the treadle in one direction upon its fulcrum the clutch-shifter or controller and shifting clutch-member may be operated to connect one of the rotating wheels with the screw-shaft, to rotate the latter in one direction; and by rocking the treadle in the other direction the said shifting clutch-member may be caused to connect the other rotating wheel with the screw-shaft, to rotate the latter in the opposite direction. Thereby, the workman is enabled to control the actuation of the depressor or hold-down, so that he may at will cause the latter to descend, remain stationary, or ascend. The described driving connections for the screw-shaft enable the ascending or descending movement of the depressor or hold-down to be instantly arrested at any point, so that in case the workman should perceive anything to be wrong during the descent of the last and shoe within the lasting devices he can promptly arrest such descent and thus avoid or lessen injury to the shoe.

In order to automatically unclutch the driving connections of the screw 117 when the proper extent of movement of the plunger-rod and depressor or hold-down in either direction has taken place, the clutch-shifter or controller 121 is arranged to be controlled by the traveler nut 116. In this instance, a rod 129 is pivoted at one end to the traveler nut 116, and extends through a hole in an arm of the clutch-shifter or controller. The rod is free to slide through the said hole in moving with the nut, until a collar 130 or 131 upon the rod brings up against the said arm so that the further movement of the rod actuates the shifter or controller. The collar 130 is arranged to engage with the arm of the shifter or controller in the movement of the nut in one direction, and the second collar, 131, is arranged to engage the shifter or controller in the movement of the nut in the other direction. This arrangement makes the machine self-stopping when the proper limit of movement of the plunger rod or depressor and hold-down in either direction has taken place, and effectually safe-guards against inadvertent overcontinuance of the pressure of the operator's foot upon the treadle. Even though the operator's foot should remain pressed upon the treadle, holding the latter in one or the other of its extreme positions, the engagement of one of the collars on the rod with the clutch-shifter or controller will automatically unclutch the driving connections from the screw-shaft, so that the endwise movement of the plunger-rod and presser or hold-down shall be automatically discontinued at the pre-arranged limit. The collars, are fastened in place upon rod 19 by clamping screws 132, 132, so that the collars may be adjusted to vary the limits in either direction.

The combination of screw, and toggles actuated by the screw, produces extreme power. If the outgoing movement of the traveler nut 116 which occasions the lifting action of the plunger-rod and depressor or hold-down should be continued too long through inattention or inadvertence of the operator in maintaining the pressure of his foot upon the treadle the machine would be strained or broken. This, and injury such as would result from too long continuance of the depressing action of the lifter rod, are effectively safeguarded against by the provisions for automatically unclutching the driving connections of the screw 17 when

the proper extent of movement of the plunger rod and depressor or hold-down in either direction has taken place.

In order to cause the depressor or hold-down or presser to move out of the way when it is separated from the lasting devices, so as to afford ample clearance for the insertion or removal of a last and shoe thereon, and also leave the operator free to use the necessary tacking or other fastening means, the depressor or hold-down is movably mounted in connection with the plunger-rod, and has combined with it means for causing it to assume a position at the rear as it rises. In the present instance, the yoke or carrier 103 of the depressor or hold-down is connected pivotally at 132ª to the plunger-rod, Figs. 1, 1ᵇ and 2, and has a forwardly projecting finger 133 intended to co-act with a stop-piece 134 attached to the lower guide, 105, for the plunger-rod. The upward movement of the plunger rod carries the said finger of the depressor or hold-down against the said stop-piece, with the result that the depressor or hold-down is swung rearward into the position shown in Fig. 1ᵇ. When the plunger rod is actuated to cause the same to descend, the descent of the plunger rod carries the finger away from the stop-piece, and the depressor or hold-down or presser swings into position to act against the insole of a shoe or the bottom of the last. A spring is employed in practice to assist the return of the hold-down or presser to working position.

It will be perceived that the invention includes a depressor or hold-down which is automatically stopped at either predetermined limit of its movement, and which may be instantly stopped and reversed at any point of its movement in either direction. Extreme watchfulness or care on the part of the operator during the depression of the shoe into the lasting devices is not essential, because the machine itself determines when the depressing function, and consequently the wiping action, has been properly completed.

The described construction of the machine enables the operator to occasion the automatic depression of the depressor or hold-down, and, if he so desires, to instantly arrest the descent thereof and of the shoe engaged thereby as soon as the top surface of the insole has reached the proper position with reference to the lasting devices. While the machine has this capacity, it is preferred to utilize the toggle action to the powerful termination of its stroke, and to utilize the automatic arrest of the descent of the presser. The automatic stopping devices are designed to make sure that the depressing action shall be arrested or stopped when the toggle is on the center. The stopping point of the presser in its descent determines the position of the upper surface of the insole of the shoe.

The resistance increases as the last and shoe pass down within the lasting devices. The actuating mechanism compensates for this in virtue of the fact that the power increases up to the limit of the strength of the metal of which the parts of the machine are composed. This is attained without in any way affecting the delicacy of the operator's control over the actuation. In an ordinary machine the increasing resistance causes the machine to strain and labor. The operator is enabled at will to close the friction-clutch members of the said actuating mechanism together with moderate pressure so as to permit slipping to occur in case of undue resistance, or he may force them together so that slipping will be absolutely impossible. In this manner the driving of the machine is subject to special control. I secure the combination of unlimited actuating power for the depressor or hold-down, and optional application of that power enabling me to graduate the amount of power to what the leather will stand. I am enabled to approach infinity at either limit. In case the leather of the upper is weak, delicacy of action can be secured by the operator; if it is otherwise, he can apply the power proportionately. By the simple control of the treadle the operator can squeeze a leather of no greater strength than a piece of paper without tearing it, or he could bite off a piece of sole leather. If the operator is aware of a weak place in the upper which he is operating upon, he can humor it by softening the action until such place has passed down below the lasting devices, and then he can apply greater power to suit the greater strength of the succeeding portion of the upper.

Reference has been made to the fact that the heel-post and toe-rest are carried by supports on slides which are adjustable by hand-screws toward and from each other in guides on a bed or platen, 5. The said bed or platen is sleeved upon a cylindrical upright portion 135 of the machine frame and adjustable vertically, this vertical adjustment enabling the lasting devices to be shifted vertically with relation to the lower limit of the movement of the depressor or hold-down. This vertical adjustment is effected by means of a hand-operated adjusting screw 136, and serves to shift the bed or platen vertically upon the main supporting standard. The bed or platen is made fast in its position of adjustment by means of a clamp operated by a handle 137, Fig. 2. The vertical adjustment of the bed or platen renders it possible to adjust the heel and toe lasting devices upon the bed to suit the spring of the last, or otherwise, and then,

ried thereby, adjust the limit of approach without touching the adjusting devices of either the heel or the toe lasting devices. Thereby, for instance, compensation may be made for a uniform increase or decrease in the thickness of the upper leather all around the shoe, or other difference that is uniform all around the shoe.

The approach of the lasted shoe and the lasting devices serves to actuate the lasting devices to wipe the upper about the last, in the sense that as the last and the upper outside of it are entered within the nest of lasting devices, such entrance causes the lasting devices to conform to the contour of the last, and forces such devices outward as the larger portion of the last presents itself. The upper, being between the last and the lasting devices, is thereby wiped in position upon the last. The equalizing device in connection with the forepart lasters operates to bring the last and shoe to central or mid-position. Thereby the pressure and consequent frictional engagement of the lasting devices with the opposite side-portions of the upper are rendered equal, and tendency to pull the upper to one side out of place is obviated.

In sequence, the chain-wiper acts first yieldingly to wipe the upper around the toe-portion of the last, this action being succeeded by that of the vamp-band 68, which is more positive in its action, and that being succeeded by the final positive crimping and crushing action of the toe-wiper chain.

The purpose of the adjustment in connection with the hand-levers 47 and 66 is to enable the operator to get a sufficient extent of inward movement of the crimping devices to give the required pressure. If when the toggle in connection with either of the said hand-levers has straightened the pressure is not sufficient, the corresponding lasting devices are backed off, and by turning the handle portion of the lever the upper arm of the lever is lengthened, the lever being then operated as before. If there is too much pressure, the reverse adjustment will be effected. The parts should be so set and the hand-lever so adjusted that in arriving at full pressure the toggle-joint will straighten. The toggles in connection with the hand-levers enable great power to be secured in operating the crimping devices.

As described, the toe wiper chain is mounted upon a support which is both spring-cushioned and positively actuated. The spring 58 by yielding prevents injury to the upper. The hand-lever toggle-arrangement is so powerful that the operator would be unable to feel any undue pressure between the last and the chain, and in consequence if the action were entirely positive the continued descent of the last might operate to break or cut the upper. The spring by yielding allows the wiping and crimping chain and its carrier to give so as to avoid injury to the upper, and its movement, being observable by the operator, serves as an indication to him that the chain has been set too far back, enabling him to back off sufficiently to obviate injury to the upper. In the final operation in toe-lasting, upward strain is exerted against the wiper-chain, which strain is sustained by the cover-plate. This strain is experienced in lasting for a welt shoe or a McKay shoe; that is to say, in a shoe having the upper wiped over the edge of the last and insole. In the case of a stitch-down shoe the final strain would be downward.

The waist lasters wipe the upper upward until it is pressed against the upturned flange of the insole. Then the said devices yield and are carried down by the pressure. In practice, in lasting a stitch-down shoe the flange or skirt of the upper is turned downward over the upper ends of the waist lasters, so that the said upper ends serve to support the flanges of the upper and insole and the sole laid thereon, thereby enabling the sole to be secured in place by cementing.

In the preliminary wiping operation, the heel-band performs in connection with the heel-portion of the upper an upward wiping action similar to that performed by the vamp-band 68 in connection with the forepart of the upper.

I claim as my invention,

1. A lasting machine having, in combination, a presser or hold-down for a last having an upper of a shoe applied thereto, lasting devices actuated to draw the upper into place around the last by the coming together or relative approach of the last and upper and the lasting devices, and means for actuating said devices at will independently of the said coming together or relative approach to effect the final operations at the bottom of the last.

2. A lasting machine having, in combination, a presser or hold-down for a last having an upper of a shoe applied thereto, lasting devices actuated to draw the upper into place around the last by the coming together or relative approach of the last and upper and the lasting devices, said devices comprising heel and toe wipers, and means for manually actuating said devices independently of the said coming together or relative approach to effect the final wiping and crimping of the upper at heel and toe.

3. A lasting machine having, in combination, a presser or hold-down for a last having an upper of a shoe applied thereto, lasting devices actuated to draw the upper into place about the last by the entry of the last and upper within the lasting devices, and power means for causing such approach, adapted to be rendered operative, and inop-

erative, and reversed, at the will of the operator, enabling him to occasion the approach or promptly arrest it, or back off.

4. A lasting machine having, in combination, lasting devices actuated to draw an upper about a last by the entry of a last having such upper applied thereto within the lasting devices, and slow-speed power means for causing such coming together, adapted to be rendered operative and inoperative, and to be reversed, all at the will of the operator, enabling him to occasion the coming together or promptly arrest it, and back off.

5. A lasting machine having, in combination, lasting devices, a screw and nut, actuating means in connection therewith, under the control of the operator, and means operatively combined with the said screw and nut through which to occasion the entry of a last with upper thereon within the said lasting devices.

6. A lasting machine having, in combination, lasting devices, a screw and nut, actuating means in connection therewith, under the control of the operator, including a reversible drive mechanism, to occasion the entry of a last with upper thereon within the said lasting devices, arrest such coming together, and back off, at will.

7. A lasting machine having, in combination, lasting devices, a screw and nut, actuating means and connections, including unshipping and reversing devices, whereby under control of the operator to occasion the entry of a last with upper thereon within the said lasting devices, arrest such coming together, and back off, all at will.

8. A lasting machine having, in combination, lasting devices, a screw and nut, means operated thereby to occasion the coming together of a last with upper thereon and the said lasting devices, and a reversible drive with shipper whereby said screw and nut may be rendered operative to occasion the entry of a last with upper thereon within the said lasting devices, arrest such coming together, and back off, all at will.

9. A lasting machine having, in combination, lasting devices, a screw and nut, means operated thereby to occasion the entry of a last with upper thereon within the said lasting devices, and a reversible drive comprising wheels by which movement of rotation in opposite directions is communicated, and controlling means for rendering at will either of said wheels operative to actuate said screw and nut or both of them inoperative.

10. A lasting machine having, in combination, lasting devices, a screw, means operated by said screw to occasion the entry of a last with upper thereon within the said lasting devices, and a reversible drive for said screw comprising wheels which rotate in opposite directions, and controlling means for rendering at will either of said wheels operative to actuate said screw, or both of them inoperative to actuate it.

11. A lasting means having, in combination, lasting devices, power-means for causing entry of a last with upper thereon within the said lasting devices, adapted to be rendered operative and inoperative at the will of the operator, enabling him to occasion the approach or promptly arrest it, and automatic means for arresting the application of power when the predetermined extent of movement has occurred.

12. A lasting machine having, in combination, lasting devices, power-means for causing entry of a last with upper thereon within the said lasting devices, adapted to be rendered operative and inoperative, and reversed, at the will of the operator, enabling him to occasion the approach, arrest, and back off, at will, and means for automatically arresting the application of power when the predetermined extent of movement in either direction has occurred.

13. A lasting machine having, in combination, lasting devices, slow-speed power-means for causing entry of a last with upper thereon within the said lasting devices, adapted to be rendered operative and inoperative, and to be reversed, all at the will of the operator, and means for automatically arresting the application of power when the predetermined extent of movement in either direction has occurred.

14. A lasting machine having, in combination, lasting devices, a screw and nut, means operatively combined with the said screw and nut through which to occasion the entry of a last with upper thereon within the said lasting devices, reversible power-driving means whereby at the will of the operator the said screw and nut may be actuated to occasion the coming together of a last with upper thereon and the said lasting devices, and reversely actuated for backing off, and means for automatically arresting the actuation of the said screw and nut when the predetermined extent of movement in either direction has occurred.

15. A lasting machine having, in combination, lasting devices, a screw and nut, means operatively combined with the said screw and nut through which to occasion the entry of a last with upper thereon within the said lasting devices, and the backing-off, a reversible drive whereby at the will of the operator the said screw and nut may be operated to cause said entry and the backing-off, and means for automatically disconnecting the driving-power when the predetermined extent of movement in either direction has occurred.

16. A lasting machine having, in combination, lasting devices, a screw and nut, means

operated thereby to occasion the entry of a last with upper thereon within the said lasting devices, and the backing-off, a reversible drive for said screw and nut comprising wheels by which movement of rotation in opposite directions is communicated, and controlling means for rendering at will either of said wheels operative to actuate said screw and nut, and means for automatically disconnecting the said wheels from the screw and nut when the predetermined extent of movement in either direction has occurred.

17. A lasting machine having, in combination, lasting devices, a toggle, actuating means in connection therewith under the control of the operator at all stages in the coming together of the last and lasting devices, and means operatively combined with the said toggle through which to occasion the coming together of a last with upper thereon and the said lasting devices.

18. A lasting machine having, in combination lasting devices, a toggle, and power-driven actuating means in connection therewith under the control of the operator, including reversing mechanism, to occasion the coming together of a last with upper thereon and the said lasting devices, arrest such coming together, and back-off, all at will.

19. A lasting machine having, in combination, lasting devices, a toggle, and toggle-actuating means comprising shipping and reversing devices whereby the operator is enabled at will to occasion the coming together of a last with upper thereon and the said lasting devices, arrest such coming together, and back-off.

20. A lasting machine having, in combination, lasting devices, a toggle, and toggle-actuating means including a reversible drive comprising wheels by which movement in opposite directions is communicated to actuate the toggle reversely, and controlling means for rendering at will either of said wheels operative to actuate said toggle to either cause the coming together of a last with upper thereon and the said lasting devices, or the backing-off, or render both of said wheels inoperative and thereby leave the toggle at rest.

21. A lasting machine having in combination, lasting devices, a toggle, and toggle-actuating means including a reversible drive comprising wheels rotating in opposite directions to actuate said toggle reversely, and controlling means for rendering at will either of said wheels operative to actuate said toggle, to either cause the coming together of a last with upper thereon and the said lasting devices, or the backing-off, or render both of the said wheels inoperative to thereby leave the toggle at rest.

22. A lasting machine having in combination, lasting devices, a toggle, power-means for actuating said toggle to cause relative approach of a last with upper thereon and the said lasting devices, adapted to be rendered operative and inoperative at the will of the operator, enabling him to occasion the approach or arrest it, and means for automatically arresting the application of power to said toggle when the predetermined extent of movement has occurred.

23. A lasting machine having, in combination, lasting devices, a toggle, and power-means for actuating said toggle to cause relative approach of a last with upper thereon and the said lasting devices, adapted to be rendered operative and inoperative, at the will of the operator, enabling him to occasion the approach and arrest it, at will.

24. A lasting machine having, in combination, lasting devices, a toggle, and power-means for actuating said toggle to cause relative approach of a last with upper thereon and the said lasting devices, adapted to be rendered operative and inoperative, and reversed, at the will of the operator, enabling him to occasion the approach or arrest it, and back-off, at will.

25. A lasting machine having, in combination, lasting devices, a toggle, power-means for actuating said toggle to cause entry of a last with upper thereon within the said lasting devices, adapted to be rendered operative and inoperative, and reversed, at the will of the operator, enabling him to occasion the approach, arrest it, and back-off, at will, and means for automatically arresting the application of power to the toggle when the predetermined extent of movement in either direction has occurred.

26. A lasting machine having, in combination, lasting devices, a toggle, slow-speed power-means for actuating said toggle to cause entry of a last with upper thereon within the said lasting devices, adapted to be rendered operative and inoperative and to be reversed, all at the will of the operator, and means for automatically arresting the application of power to the toggle when the predetermined extent of movement in either direction has occurred.

27. A lasting machine having, in combination, lasting devices, a toggle, means operatively combined with the said toggle through which to occasion the entry of a last with upper thereon within the said lasting devices, reversible power-driving means whereby at the will of the operator the said toggle may be actuated to occasion the entry of a last with upper thereon and the said lasting devices, or reversely actuated for backing-off, and means for automatically arresting the actuation of the said toggle when the predetermined extent of movement in either direction has occurred.

28. A lasting machine having, in combi-

nation, lasting devices, a toggle, means operatively combined with said toggle through which to occasion the entry of a last with upper thereon within the said lasting devices, and the backing-off, a reversible drive whereby at the will of the operator the said toggle may be operated to cause said entry or the backing-off, and means for automatically disconnecting the driving-power when the predetermined extent of movement in either direction has occurred.

29. A lasting machine having, in combination, lasting devices, a toggle, means operatively combined with said toggle through which to occasion the entry of a last with upper thereon within the said lasting devices, and the backing-off, a reversible drive for actuating said toggle comprising wheels by which movement of rotation in opposite directions is communicated, and controlling means rendering at will either of said wheels operative to actuate said toggle, and means for automatically disconnecting the said wheels from the toggle when the predetermined extent of movement in either direction has occurred.

30. A lasting machine having, in combination, lasting devices, a toggle, a screw-actuator for said toggle, power-means for actuating said screw-actuator and thereby actuating the toggle to cause entry of a last with upper thereon within the said lasting devices, adapted to be rendered operative and inoperative at the will of the operator, enabling him to occasion the approach and arrest it, at will.

31. A lasting machine, in combination, lasting devices, a toggle, a screw-actuator for said toggle, power-means for actuating said screw-actuator and thereby actuating the toggle to cause relative approach of a last with upper thereon and the said lasting devices, adapted to be rendered operative and inoperative, and reversed, at the will of the operator, enabling him to occasion the approach, arrest it, and back off, at will.

32. A lasting machine having, in combination, lasting devices, a toggle, a screw-actuator for said toggle, and actuating means for said screw-actuator under control of the operator, including a reversible drive mechanism, to occasion the coming together of a last with upper thereon and the said lasting devices, arrest such coming together, and back-off, all at will.

33. A lasting machine having, in combination, lasting devices, a toggle, a screw-actuator for said toggle, and actuating means for said screw-actuator comprising shipping and reversing devices whereby the operator is enabled at will to occasion the coming together of a last with upper thereon and the said lasting devices, arrest such coming together, and back-off.

34. A lasting machine having, in combination, lasting devices, a toggle, a screw-actuator for said toggle, and actuating means for said screw-actuator including a reversible drive comprising wheels by which movement in opposite directions is communicated to actuate the toggle reversely, and controlling means for rendering at will either of said wheels operative to actuate said toggle, to either cause the coming together of a last with upper thereon and the said lasting devices, or the backing-off, or render both of said wheels inoperative and thereby leave the toggle at rest.

35. A lasting machine having, in combination, lasting devices, a toggle, a screw-actuator for said toggle, and actuating means for said screw-actuator including a reversible drive comprising wheels rotating in opposite directions to actuate said screw-actuator reversely, and controlling means for rendering at will either of said wheels operative to actuate said toggle, to either cause the coming together of a last with upper thereon and the said lasting devices, or the backing-off, or render both of the said wheels inoperative to thereby leave the toggle at rest.

36. A lasting machine having, in combination, lasting devices, a toggle, a screw-actuator for said toggle, power-means for actuating said screw-actuator to cause relative approach of a last with upper thereon and the said lasting devices, adapted to be rendered operative and inoperative at the will of the operator, enabling him to occasion the approach or arrest it, and means for automatically arresting the application of power to said toggle when the predetermined extent of movement has occurred.

37. In a lasting machine, in combination, a hold-down or presser, actuating means therefor adapted to enable said hold-down or presser to be instantly stopped and reversed at any point in its movement in either direction, and means for automatically stopping the said hold-down or presser at either predetermined limit of its movement.

38. In a lasting machine, in combination, a hold-down or presser, a plunger-rod with which the said hold-down is connected, a double toggle-mechanism connecting with said plunger-rod at opposite sides of the axis of the latter, and power-driven actuating means for the toggles under the control of the operator.

39. In a lasting machine, in combination, a hold-down or presser, a plunger-rod with which the same is connected, a double toggle-mechanism connecting with said plunger-rod at opposite sides of the axis of the latter, a traveler-nut and connections from the respective sides of the same to the respective toggles, and an actuating screw for said traveler-nut.

40. In a lasting machine, in combination, a hold-down or presser, an actuating toggle in connection therewith, a traveler-nut in connection with said toggle, an actuating screw for said traveler-nut, and a reversible drive-mechanism for said screw.

41. In a lasting machine, in combination, a hold-down or presser, an actuating toggle in connection therewith, a traveler-nut in connection with said toggle. an actuating screw for said traveler-nut, wheels which respectively rotate in opposite directions relative to each other, and means for operatively connecting the respective wheels with the actuating screw to rotate the latter in either direction at will.

42. In a lasting machine, in combination, a hold-down or presser, an actuating toggle in connection therewith, a traveler-nut in connection with said toggle, an actuating screw for said traveler-nut, wheels which respectively rotate in opposite directions relative to each other, and means for clutching the respective wheels with the said actuating screw at will.

43. In a lasting machine, in combination, a hold-down or presser, an actuating toggle in connection therewith, a traveler-nut in connection with said toggle, an actuating screw for said traveler-nut, a reverse-drive mechanism for said screw, and means for automatically disconnecting the driving power from the screw at the predetermined limit of movement of the parts in either direction.

44. In a lasting machine, in combination, a hold-down or presser, an actuating toggle in connection therewith, a traveler-nut in connection with said toggle, an actuating screw for said traveler-nut, a reverse-drive mechanism for said screw, and means operated by the traveler-nut to automatically disconnect the driving power from the screw at the predetermined limit of movement in either direction.

45. In a lasting machine, in combination, a hold-down or presser for a last, and a reversible-drive mechanism for actuating the same, including a friction-clutch adapted to be varied in its driving efficiency.

46. In a lasting machine, in combination, a hold-down or presser, an actuating screw in operative connection therewith, and actuating means for the said screw including friction-clutch devices adapted to be varied in driving efficiency to vary the force transmitted through the screw and connections to the hold-down or presser.

47. In a lasting machine, in combination, a hold-down or presser, an actuating toggle-mechanism therefor, an actuating screw in operative connection with said toggle-mechanism, and actuating means for the said screw including friction-clutch devices adapted to be varied in driving efficiency, to vary the force transmitted through the screw and connections to the hold-down or presser.

48. In a lasting machine, in combination, a hold-down or presser, an actuating toggle-mechanism therefor, an actuating screw in operative connection with said toggle-mechanism, wheels which respectively are rotated in opposite directions relative to each other, and friction-clutch devices for placing the respective wheels in driving connection with the said screw.

49. A lasting machine having, in combination, a last-support normally held yieldingly in outstanding position relative to the lasting devices, and lasting devices self-conforming to rights and lefts interchangeably and actuated by relative approach between the last-support and the lasting devices.

50. A lasting machine having, in combination, heel and toe lasting devices and a hold-down or presser relatively movable toward and from each other, and a support for said lasting devices collectively having an adjustment to adjust the plane of lasting action.

51. A lasting machine having, in combination, a presser, a last-support, heel and toe lasting devices, and means to adjust the lasting devices collectively bodily toward and from the presser.

52. A lasting machine having, in combination, a presser, a last-support, heel and toe lasting-devices for wiping the upper around a sole upon a last, and means to adjust the lasting devices collectively bodily toward and from the presser to adjust the plane of action of the lasting devices.

53. A lasting machine having, in combination, heel and toe lasting devices, a hold-down or presser, means for causing relative approach of said hold-down or presser and the lasting devices, means to adjust the lasting devices collectively toward and from the hold-down or presser to adjust the plane of action of the lasting devices, and means for bodily adjusting the heel lasting devices independently of the toe lasting devices in the line of the said approach.

54. A lasting machine having, in combination, heel and toe lasting devices, a hold-down or presser, means for causing relative approach of said hold-down or presser and the lasting devices, means to adjust the lasting devices collectively toward and from the hold-down or presser to adjust the plane of action of the lasting devices, and means for bodily adjusting the toe lasting devices independently of the heel lasting devices in the line of the said approach.

55. A lasting machine having, in combination, heel and toe lasting devices, means for supporting a last with upper thereon in position to be operated upon by the said devices, means to adjust the lasting devices

collectively toward and from the hold-down or presser to adjust the plane of action of the lasting devices, and means for bodily adjusting the heel lasting devices vertically with relation to the bottom of the last independently of the toe lasting devices.

56. A lasting machine having, in combination, heel and toe lasting devices, means for supporting a last with upper thereon in position to be operated upon by the said devices, means to adjust the lasting devices collectively toward and from the hold-down or presser to adjust the plane of action of the lasting devices, and means for bodily adjusting the toe lasting devices vertically with relation to the bottom of the last independently of the heel lasting devices.

57. A lasting machine having, in combination, a heel-pin, a support therefor, heel lasting devices having a supporting sleeve mounted on said support and adapted to swing transversely concentrically with the heel-pin.

58. A lasting machine having, in combination, a support, heel lasting devices having a supporting sleeve mounted on said support, and a collar in threaded engagement with said support whereby by adjusting said collar the heel lasting devices are adjusted bodily vertically.

59. A lasting machine having, in combination, a heel-pin, a support therefor, heel lasting devices having a supporting sleeve mounted on said support and adapted to swing transversely concentrically with the heel-pin, to conform to the swing of the last, and a collar vertically adjustable on said support whereby the heel lasting devices are adjusted bodily vertically.

60. A lasting machine having, in combination, a heel-pin, a support therefor, heel lasting devices having a supporting sleeve mounted on said support, and a collar in threaded engagement with said support whereby by adjusting said collar the heel lasting devices are adjusted bodily vertically.

61. A lasting machine having, in combination, last-supporting means comprising a toe-rest, a support for said toe-rest, toe lasting devices having a supporting sleeve mounted on said support, and a collar in threaded engagement with said support whereby by adjusting the said collar the toe lasting devices are adjusted bodily vertically.

62. A lasting machine having, in combination, a toe-rest, a support therefor, toe lasting devices having a supporting sleeve mounted on said support and adapted to swing transversely concentrically with the toe-rest to conform to the swing of the last, and a collar vertically adjustable on said support whereby the toe lasting devices are adjusted bodily vertically.

63. A lasting machine having, in combination, a toe-rest, a support therefor, toe lasting devices having a supporting sleeve mounted on said support, and a collar in threaded engagement with said support whereby by adjusting said collar the toe lasting devices are adjusted bodily vertically.

64. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of the heel of the last, a sleeve upon said post, and heel lasting devices supported by said sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last.

65. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of the heel of the last, a sleeve upon said post, heel lasting devices supported by said sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last, and means for adjusting the said heel lasting devices vertically.

66. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of the heel of the last, a sleeve upon said post, means for adjusting said sleeve vertically upon the post, and heel lasting devices supported by the sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last.

67. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of the heel of the last, a sleeve upon said post, a collar in threaded engagement with said post for adjusting said sleeve vertically upon the post, and heel lasting devices supported by the sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last.

68. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of the toe of the last, a sleeve upon the said post, toe lasting devices supported by said sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last, and means for adjusting the said toe lasting devices vertically.

69. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of the toe of the last, a sleeve upon the said post, means for adjusting said sleeve vertically upon the post, and toe lasting devices supported by the sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last.

70. A lasting machine having, in combination, last-supporting means, a post lo-

cated in line with the center of the curve of the toe of the last, a sleeve upon said post, a collar in threaded engagement with said post for adjusting said sleeve vertically upon the post, and toe lasting devices supported by the sleeve and adapted to swing transversely concentrically with said curve to conform to the swing of the last.

71. A lasting machine having, in combination, last-supporting means, a post adjacent one end of the last, a sleeve upon the said post, a mounting connected to said sleeve with capacity to swing vertically to adjust the inclination of the plane of action of the lasting devices to suit the pitch of the last, and lasting devices carried by said mounting with capacity to rock transversely to suit the twist of the last, and adapted to be swung transversely to conform to the swing of the last.

72. A lasting machine having, in combination, last-supporting means, a post located in line with the center of the curve of one end of the last, a sleeve upon said post, a mounting connected to said sleeve with capacity to swing vertically to adjust the inclination of the plane of action of the lasting devices to suit the pitch of the last, and lasting devices carried by the said mounting with capacity to rock transversely to suit the twist of the last and adapted to be swung transversely to conform to the swing of the last.

73. A lasting machine having, in combination, lasting devices, a carrier therefor, means for actuating the carrier and lasting devices to perform the lasting operation and parallel-motion supporting links on which said carrier swings in being actuated for the lasting operation and retracted.

74. A lasting machine having, in combination, lasting devices, a carrier therefor, a mounting, parallel-motion swinging-link carrier-supporting means in connection with said mounting, actuating means for said carrier and lasting-devices, and means providing for adjustment of the carrier and mounting to suit the pitch of the last.

75. A lasting machine having, in combination, lasting devices, a carrier therefor, last-supporting means, a post adjacent one end of the last, a sleeve on said post, provided with a mounting, and adapted to turn about the post, and parallel-motion swinging-link carrier-supporting means in connection with said mounting.

76. A lasting machine having, in combination, lasting devices, a carrier therefor, last-supporting means, a post adjacent one end of the last, a sleeve on said post adapted to turn about the latter, a mounting connected with said sleeve, parallel-motion swinging-link carrier-supporting means in connection with said mounting, and means to adjust the said mounting to cause the lasting devices to conform to the pitch of the last.

77. A lasting machine having, in combination, lasting devices, a carrier therefor, last-supporting means, a post adjacent one end of the last, a sleeve on said post adapted to turn about the latter, a mounting connected pivotally with said sleeve, parallel-motion swinging-link carrier-supporting means in connection with said mounting, and adjusting means for said mounting to adapt the lasting devices to the pitch of the last.

78. A lasting machine having, in combination, lasting devices, a carrier therefor, and a toggle for actuating said carrier and lasting devices to perform the lasting opertation.

79. A lasting machine having, in combination, lasting devices, a carrier therefor, a toggle for actuating said carrier and lasting devices to perform the lasting operation, and means for varying the effective length of the toggle.

80. A lasting machine having, in combination, lasting devices, a carrier therefor, a toggle for actuating the carrier and lasting devices to perform the lasting operation, and means for varying the effective length of one of the toggle-members to thereby vary the effect of the toggle.

81. A lasting machine having, in combination, lasting devices, a carrier therefor, a toggle for actuating the carrier and lasting devices to perform the lasting operation, and a combined toggle-operating handle and adjusting device for varying the effective length of the toggle.

82. A lasting machine having, in combination, lasting devices, a carrier therefor, a toggle for actuating the carrier and lasting devices to perform the lasting operation, the said toggle comprising link-members pivotally connected together, and a hand-lever with which one of said link-members is connected by a screw-connection providing for adjustment of the effective length of the toggle by the turning of the handle-portion of said hand-lever.

83. A lasting machine having, in combination, lasting devices, a carrier therefor mounted to swing, a link operatively connecting with said carrier and forming a toggle-member, a second toggle-member pivotally connecting with the first, a pivotally supported mounting, and a hand-lever combined with said mounting, rotatable, and in screw-threaded engagement with the second toggle-member, whereby by means of the hand-lever the toggle may be operated to actuate the lasting devices, and by rotating the handle the toggle-length may be adjusted.

84. A lasting machine having, in combination, lasting devices, swinging-link parallel-motion supporting means therefor, a toggle

comprising a member operatively connecting with said lasting devices, a second member pivotally engaged with the first, and a pivotally supported mounting, and an operating lever or handle combined with said mounting, and in screw-threaded adjustable connection with the second toggle-member.

85. A lasting machine having, in combination, lasting devices, parallel-links supporting said devices, a toggle comprising a member operatively connecting with said parallel-links, a second member pivotally engaged with the first, and a pivotally supported mounting, and an operating lever or handle combined with said mounting and in adjustable screw-threaded connection with the second toggle-member.

86. A lasting machine having, in combination, last-supporting means, wiper lasting-devices, and means for actuating said lasting-devices to wipe the edge of the upper around the edge of the last and during the wiping action press the wipers more closely toward the bottom of the last.

87. A lasting machine having, in combination, last-supporting means, wiper lasting devices, swinging carrying means for said devices constructed to permit the wiping action and cause the wipers to press more closely toward the bottom of the last in the final portion of such action.

88. A lasting machine having, in combination, last-supporting means, wiper lasting devices, and parallel-link supporting means for said devices operating in the final portion of the wiping action to press the wipers more closely toward the bottom of the last.

89. A lasting machine having, in combination, an actuating carrier, a plate movably mounted thereon, arms pivotally connected to said plate, a compressor-band having its opposite end-portions connected to said arms, and a spring cushion between a part of said carrier and a part of said plate through which movement is transmitted from the carrier to the plate and band.

90. A lasting machine having, in combination, an actuating carrier, a compressor-band carrier movably combined therewith, arms pivotally connected to said compressor-band carrier, a compressor-band having its opposite end-portions connected to said arms, a spring cushion between parts of the respective carriers and through which movement is transmitted from the actuating carrier to the compressor-band carrier, wipers, carrying-levers therefor connected to travel with the actuating carrier, a spring acting upon said levers to open the wipers, and means carried by the compressor-band carrier acting upon the said levers in the independent movement of the actuating carrier to occasion the closing movement of the wipers.

91. A lasting machine having, in combination, an actuating carrier having upstanding lugs, a plate movably mounted on said carrier and having openings through which said lugs project, arms pivotally connected to said plate, a compressor-band having its opposite end-portions connected to said arms, a pin carried by said lugs and fitting bearings in said plate, permitting the plate to rock transversely to conform to the twist of the last, the said pin adapted to slide lengthwise in said bearings, a spring cushion through which movement is transmitted from the actuating carrier to the said plate, a second plate mounted upon the compressor-band plate and engaged and actuated by one of the lugs of the actuating carrier, wiper-carrying levers pivoted to said second plate, wipers combined with said levers, a spring acting to open the levers and wipers, and means carried by the compressor-band plate acting upon the levers in the independent movement of the actuating carrier to occasion the closing movement of the wipers.

92. A lasting machine having lasting devices comprising a floating flexible wiper-chain composed of a series of links connected together so as to be capable of play or flexure in the plane of the chain, whereby the chain is enabled to conform itself closely to the contour of the exterior of the last.

93. A lasting machine having, in combination, a transversely floating flexible wiper-chain composed of a series of links jointed together and capable of play or flexure in the plane of the chain, means for moving said wiper-chain into position to partly encircle a last with upper thereon, and means to occasion relative movement between the last and upper and the encircling wiper-chain to wipe the upper upward into place about the last.

94. A lasting machine having, in combination, a transversely floating flexible wiper-chain composed of a series of links jointed together and capable of play or flexure in the plane of the chain, said chain adapted to partly encircle a last with upper thereon, and means for actuating said wiper-chain to wipe the upper around the edge of the last and crimp it over the bottom thereof or a sole thereon.

95. A lasting machine having, in combination, a transversely floating flexible wiper-chain composed of a series of links jointed together and capable of play or flexure in the plane of the chain, said chain adapted to partly encircle a last with upper thereon, means to occasion relative movement between the last and upper and the encircling wiper-chain to wipe the upper upward into place about the last, and means for moving said wiper-chain inward into position to engage with the upper around the contour of the last for the wiping action, and for moving

it farther inward to wipe the upper around the edge of the last and crimp it over the bottom thereof or a sole thereon.

96. A lasting machine having, in combination, a transversely floating flexible wiper-chain composed of a series of links jointed together and capable of play or flexure in the plane of the chain, said chain confined to prevent it from being sprung either downward or upward, means for moving said wiper-chain into position to partly encircle a last with upper thereon, and means to occasion relative movement between the last and upper and the encircling wiper-chain to wipe the upper upward into place about the last.

97. A lasting machine having, in combination, a wiper-carrying plate, opposite arms hung to said plate, and a transversely floating flexible wiper-chain which conforms to the contour of the end-portion of the last, said chain composed of a series of links jointed together and capable of lateral play or flexure in the plane of the chain.

98. A lasting machine, having, in combination, a wiper-carrying plate, a transversely floating flexible wiper-chain composed of a series of links jointed together and capable of play or flexure in the plane of the chain, said chain adapted to partly encircle a last with upper thereon, and means to occasion relative movement between the last and upper and the encircling wiper-chain, at first with yielding action to wipe the upper upward into place about the last, and then with positive action to wipe the upper around the edge of the last and crimp it over the bottom thereof or a sole thereon.

99. A lasting machine having, in combination, a wiper-band which embraces one end and portions of two sides of a last with the upper thereon, means for producing relative movement of said wiper-band and last causing said last to enter the said wiper-band, and means acting during such relative movement to close the wiper-band against the upper and last to engage with the upper to wipe the upper upwardly into place about the last.

100. A lasting machine having, in combination, a wiper-band which embraces one end and portions of two sides of a last with upper thereon, means for producing relative movement of said wiper-band and last causing said last to enter the said wiper-band, and means actuated through such entrance to close the wiper-band against the upper and last to engage with the upper to wipe the upper upward into place about the last.

101. A lasting machine having, in combination, a wiper-band which embraces one end and portions of two sides of a last with upper thereon, means for producing relative movement of said wiper-band and last causing said last to enter the inclosure of the wiper-band, and a last-support actuating said wiper-band to close against the upper and last so as to engage with the upper to wipe the latter upward into place about the last.

102. A lasting machine having, in combination, a wiper-band, means for producing relative movement of said wiper-band and a last with upper thereon causing said last to enter the inclosure of the wiper-band, and a toe-rest engaged by the last and actuating the wiper-band to close it against the upper and last so as to engage with the upper to wipe the latter upward into place about the last.

103. A lasting machine having, in combination, a wiper-band, swinging arms connected therewith, and means actuated by the entrance of a last with upper thereon into the inclosure of said wiper-band to move the opposite portions of the wiper-band against the upper and last.

104. A lasting machine having, in combination, a wiper-band, swinging arms connected therewith, and a toe-rest operated by the entrance of a last with upper thereon into the inclosure of the wiper-band and acting to move the opposite portions of the wiper-band inward against the upper and last.

105. A lasting machine having, in combination, a wiper-band, swinging arms connected therewith, a member connected with said arms and normally acting to keep the wiper-band expanded, and a toe-rest operated by the entrance of a last with upper thereon into the inclosure of the wiper-band and actuating the said member to in turn actuate said swinging arms to close the wiper-band into wiping engagement with the said upper.

106. A lasting machine having, in combination, a wiper-band, swinging arms connected therewith, a member linked to projections from said arms and spring-actuated to keep the wiper-band normally expanded, and a toe-rest in yielding connection with said member and operated by the entrance of a last with upper thereon into the inclosure of the wiper-band to actuate the said member to in turn actuate the swinging arms to close the wiper-band into wiping engagement with the said upper.

107. A lasting machine having, in combination, a wiper-band which incloses one end and portions of the length of a last, swinging arms connected with said wiper-band and spring-actuated to hold the wiper-band inward toward the last, and means for producing relative approach of a last with upper thereon and said wiper-band to occasion entrance of the last and upper within the

inclosure of the wiper-band and the wiping of the upper upward into place around the last.

108. A lasting machine having, in combination, a wiper-band which incloses one end and portions of the length of a last, and inwardly-inclined swinging posts supporting the wiper-band by their upper portions and spring-actuated to hold the wiper-band contracted inwardly for yielding wiping engagement with the upper upon a last as such last enters the inclosure of the wiper-band.

109. A lasting machine having, in combination, a last-support, a wiper, and a post inclining from its pivot upward and inward toward the last-support and supporting said wiper by its upper end and spring-actuated to hold the wiper normally inward for yielding wiping engagement with the upper upon a last as such last is depressed relative to the wiper.

110. A lasting machine having, in combination, a wiper-band adapted to encircle one end and extend along the sides of a last, crimping wipers, and means for producing relative approach between the last and the wiper-devices and thereby causing the last with upper thereon to enter within the wiper-devices, whereby a preliminary wiping of the upper into place about the last is effected, and means for operating said crimping wipers to wipe over and crimp the portions of upper projecting at the bottom of the last.

111. A lasting machine having, in combination, a wiper-band adapted to encircle one end and extend along the sides of a last, crimping wipers, means for producing relative approach between the last and the wiper-devices and thereby causing the last with upper thereon to enter within the wiper-devices, whereby a preliminary wiping of the upper into place about the last is effected, means for operating said crimping wipers to wipe over and crimp the portions of upper projection at the bottom of the last, and a mounting for said wiper-band and crimping-wipers in common, adjustable to conform to the pitch and the swing of the last.

112. A lasting machine having, in combination, a movable last-support, and waist-wiper devices actuated by said last-support to wipe the waist-portion of the upper into place about the last as the last and upper thereof enter between the said devices.

113. A lasting machine having, in combination, wiper devices constructed to close against a last with upper thereon as it enters between them, and to move in the same direction as the last and upper but at slower speed, thereby wiping the upper into place about the last.

114. A lasting machine having, in combination, a movable last-support, and wiper devices arranged to close against a last and upper as they enter between them, and actuated from said last-support to move in the same direction as the last and upper but at slower speed, thereby wiping the upper into place about the last.

115. A lasting machine having, in combination, waist-wiper devices constructed to close against a last with upper thereon entered between them, and to move in the same direction as the last and upper at slower speed, thereby wiping the waist of the upper into place about the last.

116. A lasting machine having, in combination, a movable last-support, and waist-wiper devices arranged to close against a last and upper as they enter between them, and actuated from said last-support to move in the same direction as the last and upper at slower speed, thereby wiping the waist of the upper into place about the last.

117. A lasting machine having, in combination, a wiper, a movable last-support, and means for actuating said wiper to move in unison with the last-support, in the same direction, at a slower rate of speed, whereby the wiping action results from the difference in the rates of movement.

118. A lasting machine having, in combination, a movable last-support, a wiper-carrier, and a wiper yieldingly mounted on said wiper-carrier, the said wiper-carrier operated by the moving last-support to move the wiper in the same direction at a slower rate of speed, whereby the wiping action results from the difference in the rates of movement.

119. A lasting machine having, in combination, a movable last-support, a wiper, and a swinging member actuated by said last-support in the movement of the latter and actuating the wiper with reduction in the leverage whereby the wiper is caused to move in the same direction as the last but at less speed.

120. A lasting machine having, in combination, a movable last-support, a swinging wiper-actuating member to which power is communicated from the last-support, and a wiper connected with said member at a point between that of the application of said power and the pivotal axis of the said member.

121. A lasting machine having, in combination, a movable last-support, a swinging wiper-carrier actuated by power communicated from said last-support in the movement of the latter, and a wiper connected with the wiper-carrier between the pivotal axis thereof and the point of application of such power, and thereby caused to move in the same direction as the last-support but at a different rate of speed.

122. A lasting machine having, in combination, a movable last-support, a swinging wiper-carrier actuated by power communicated thereto from said last-support, and a yieldingly-backed wiper connected with the wiper-carrier between the pivotal axis of the latter and the point of application of such power, and thereby caused to move in the same direction as the last-support but at a different rate of speed.

123. A lasting machine having, in combination, a wiper-support, and a wiper mounted thereon to swivel on a vertical axis and thereby accommodate itself to the longitudinal contour of the last.

124. A lasting machine having, in combination, a movable last-support, a swinging wiper-carrier actuated by power communicated thereto from said last-support, a yieldingly-backed wiper-support connected with said wiper-carrier between the pivotal axis of the latter and the point of application of the said power, and a wiper mounted on said wiper-support with capacity to swivel on a vertical axis and thereby accommodate itself to the shape of the last.

125. A lasting machine having, in combination, a movable last-support, opposite swinging wiper-actuating members actuated by power communicated thereto from said last-support, and wipers connected with the respective members between the pivotal axes of the latter and the points of application of the said power, and thereby caused to move in the same direction as the last but at a different rate of speed.

126. A lasting machine having, in combination, a movable last-support, oppositely pivoted swinging wiper-carriers actuated by power communicated to their inner portions from said last-support, and yieldingly-backed wipers connected with the respective wiper-carriers between the power-receiving points and the pivotal axes, whereby the wipers are caused to move in the same direction as the last but at less speed.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK W. MERRICK.

Witnesses:

CHAS. F. RANDALL,

ELLEN O. SPRING.

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C. F. PYM.

LASTING MACHINE.

APPLICATION FILED DEC. 13, 1915.

1,368,968.

Patented Feb. 15, 1921.

9 SHEETS—SHEET 1.

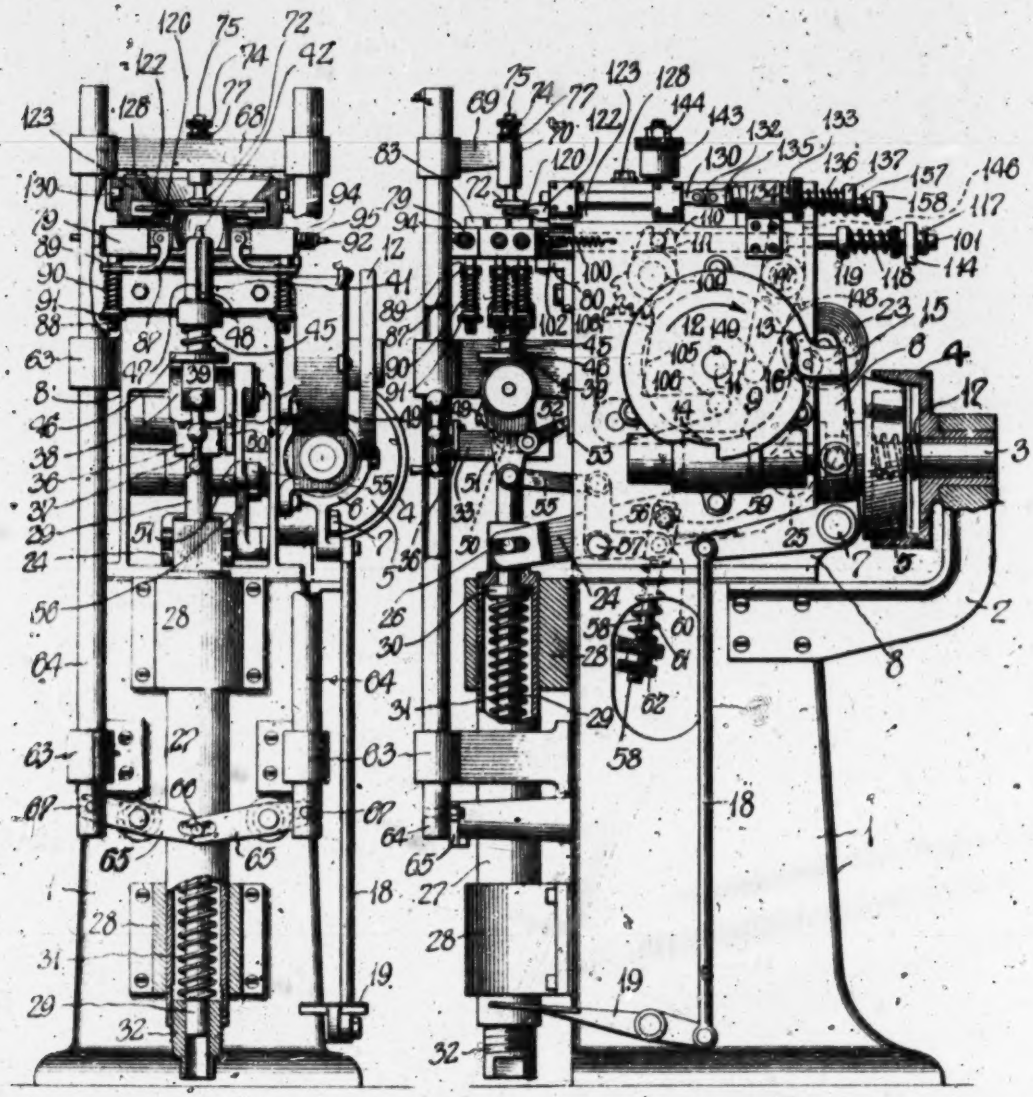


Fig. 1.

Fig. 2.

Witnesses

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C. F. PYM.

LASTING MACHINE.

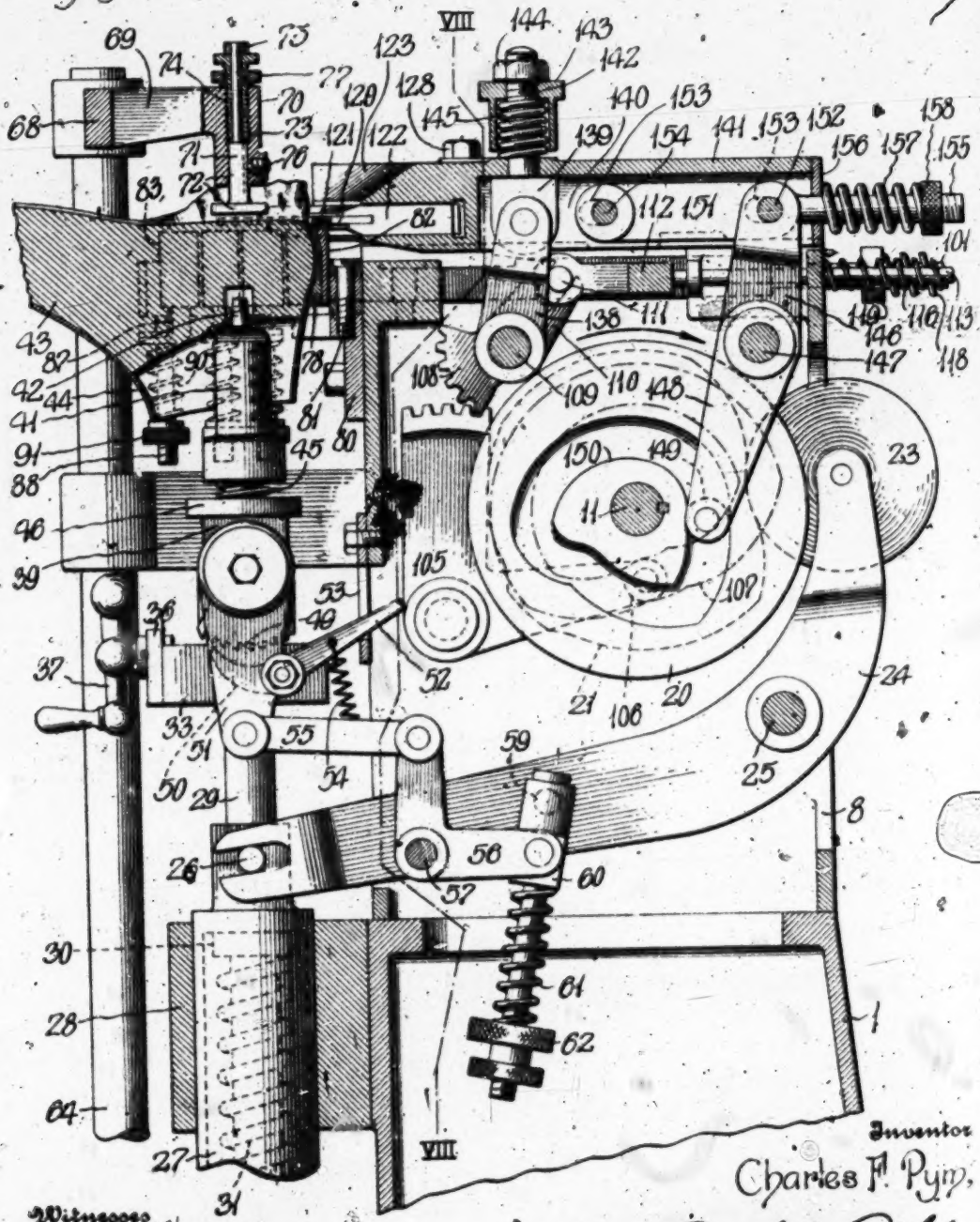
APPLICATION FILED DEC. 13, 1915.

1,368,968.

Patented Feb. 15, 1921.

9 SHEETS—SHEET 2.

Fig. 3.



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LASTING MACHINE.

APPLICATION FILED DEC. 13, 1915.

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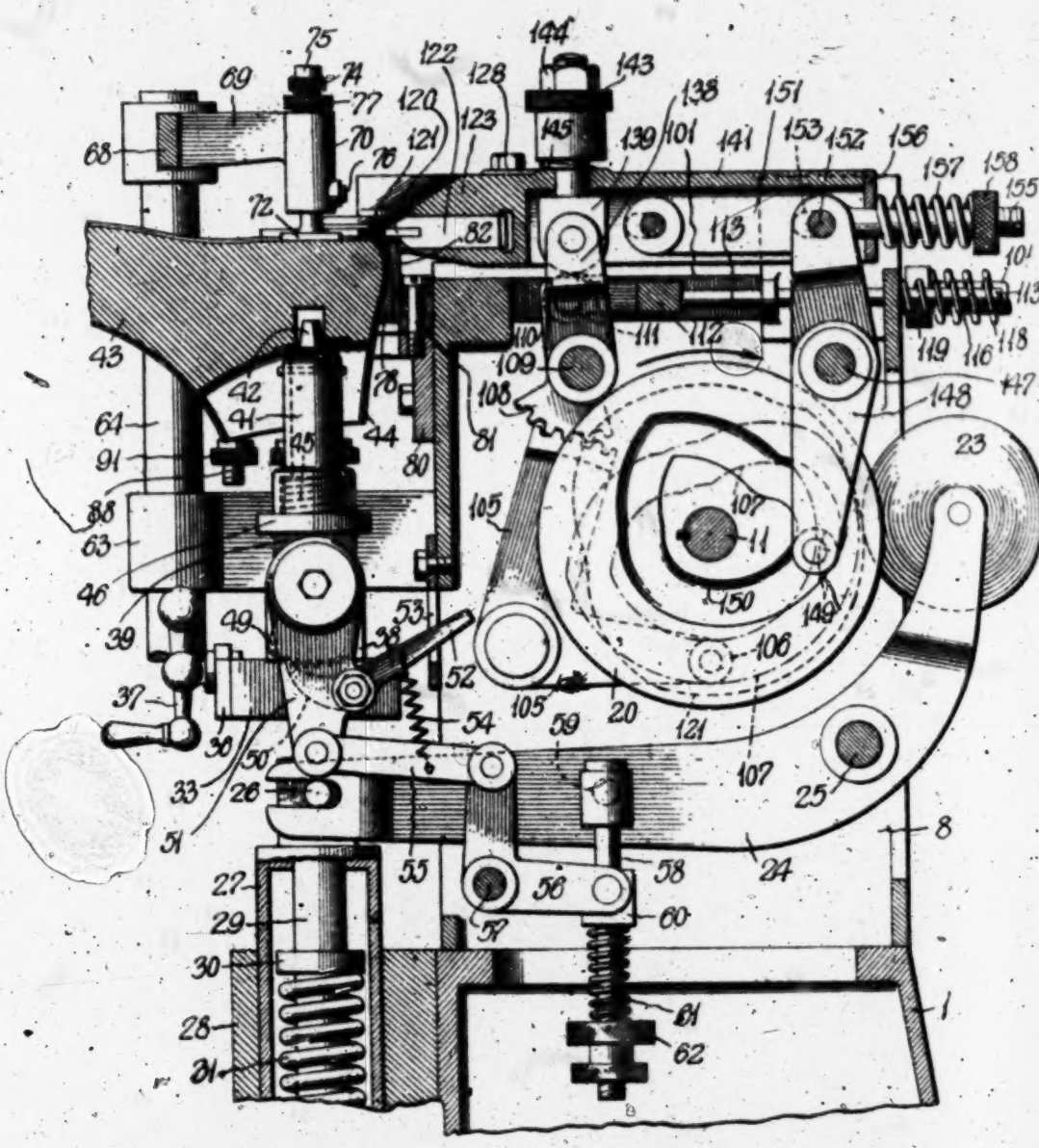


Fig. 4.

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APPLICATION FILED DEC. 13, 1915.

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Patented Feb. 15, 1921.

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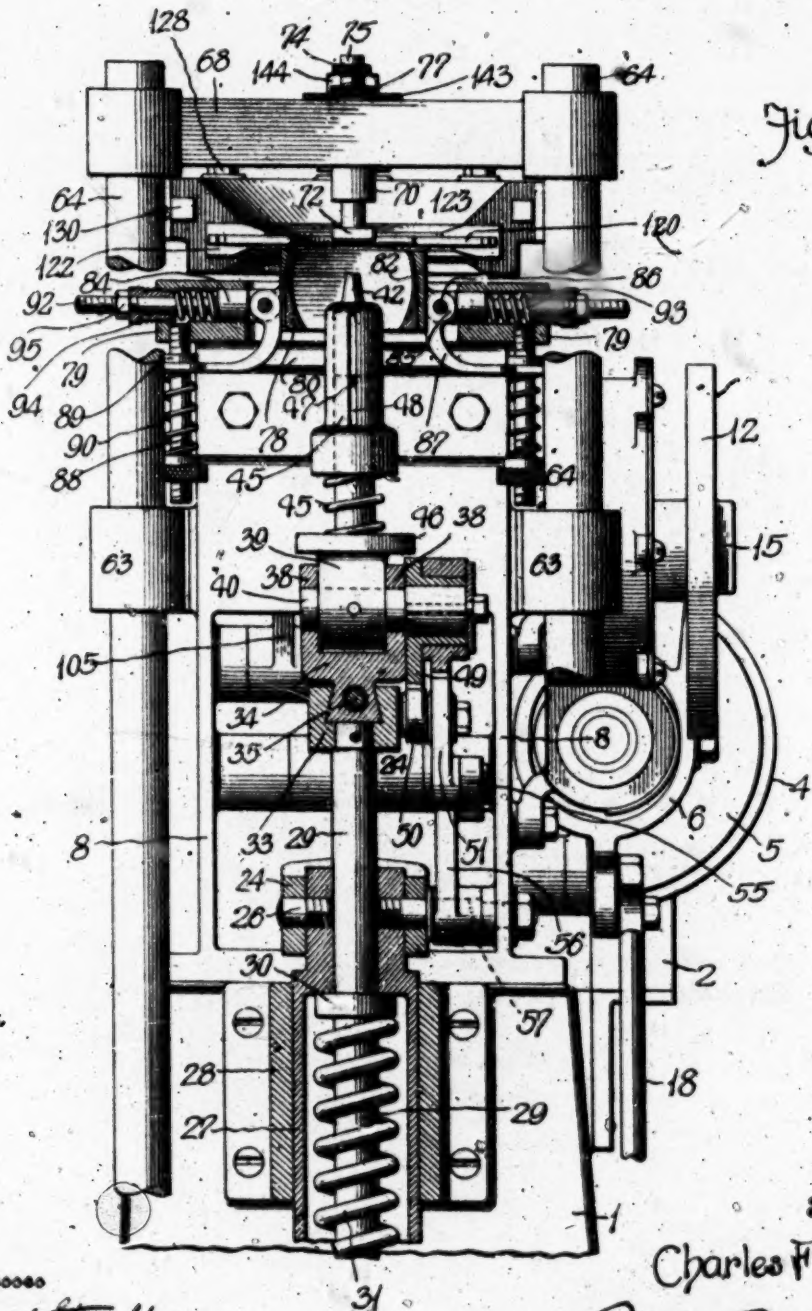


Fig. 5.

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LASTING MACHINE.

APPLICATION FILED DEC. 13, 1915.

1,368,968.

Patented Feb. 15, 1921.

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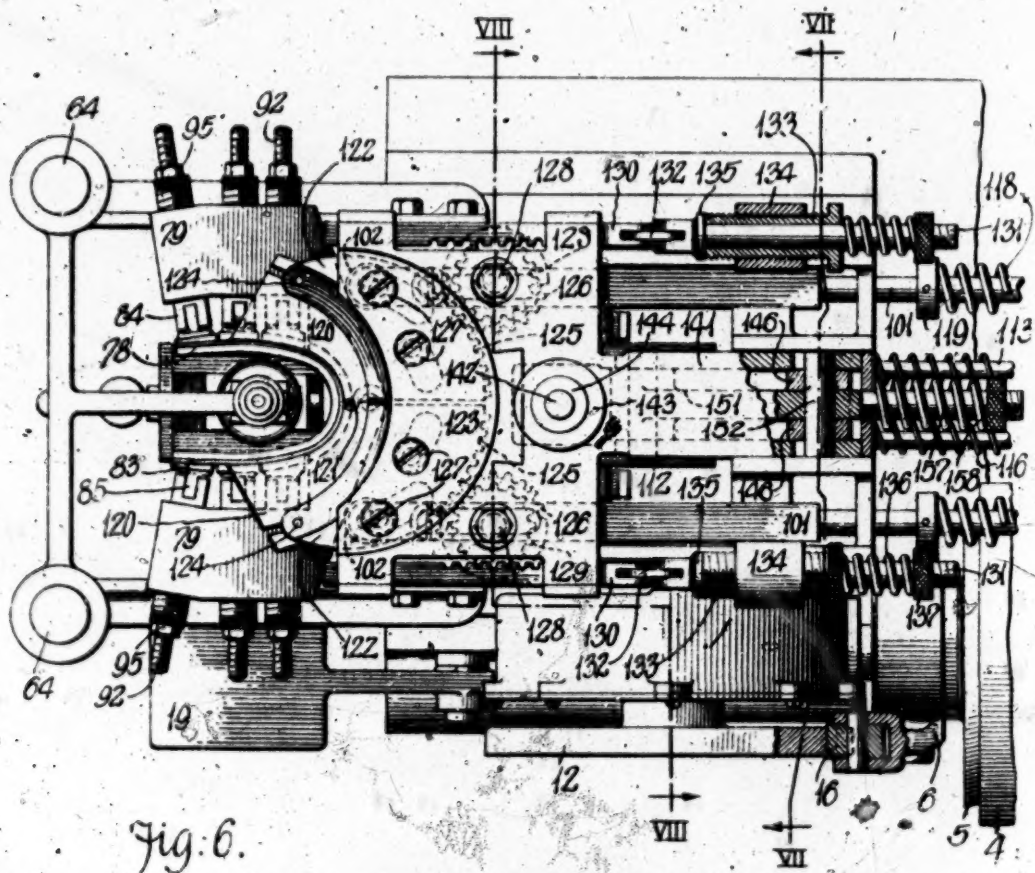


Fig. 6.

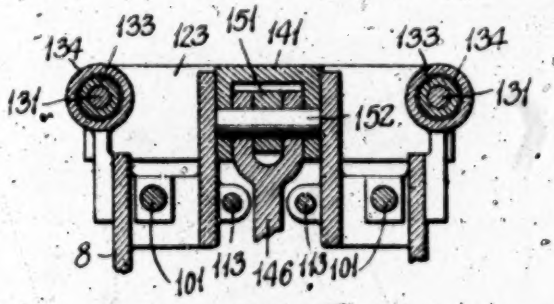


Fig. 7.

Witnesses

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LASTING MACHINE.

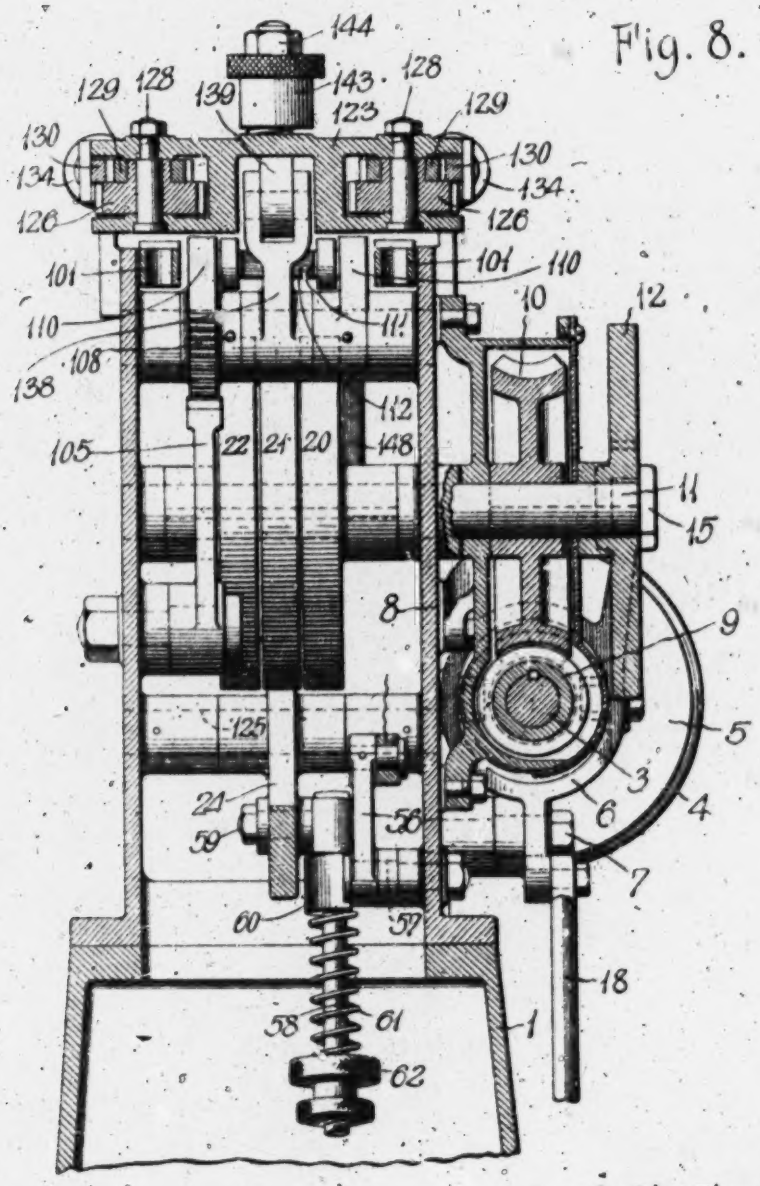
APPLICATION FILED DEC. 13, 1915.

1,368,968.

Patented Feb. 15, 1921.

9 SHEETS—SHEET 6.

Fig. 8.



Witnesses

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LASTING MACHINE.

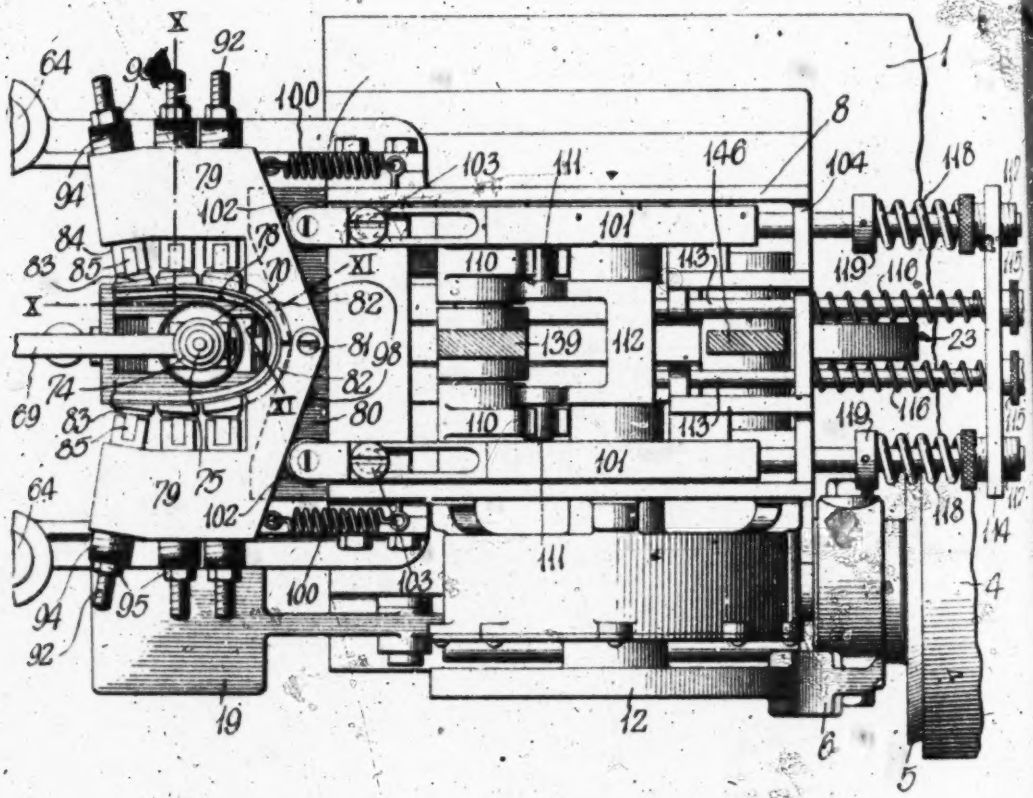
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1,368,968

Patented Feb. 15, 1921

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Fig. 9.



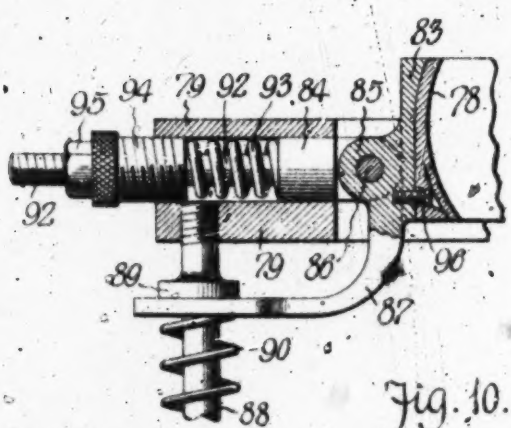


Fig. 10.

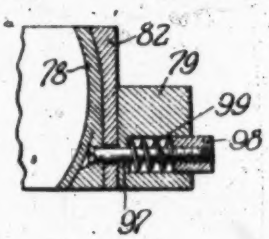


Fig. 11.

Witnesses

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LASTING MACHINE.

APPLICATION FILED DEC. 13, 1915.

1,368,968.

Patented Feb. 15, 1921.

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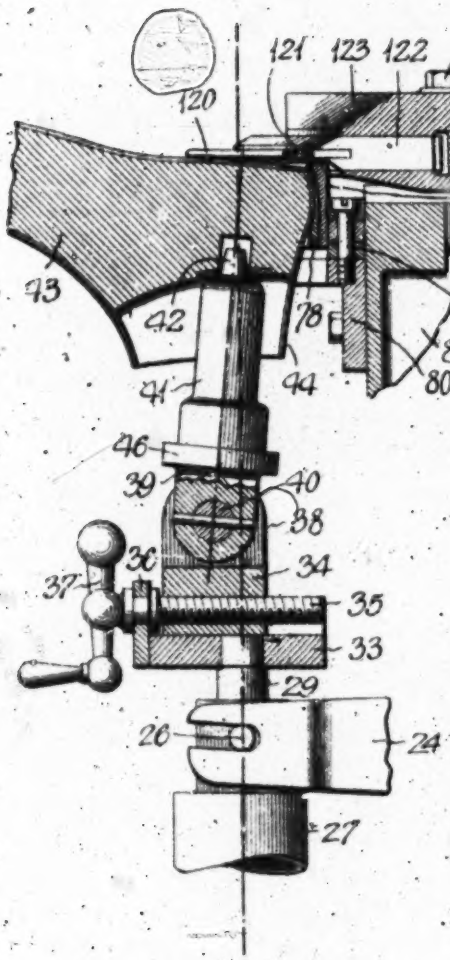


Fig. 12.

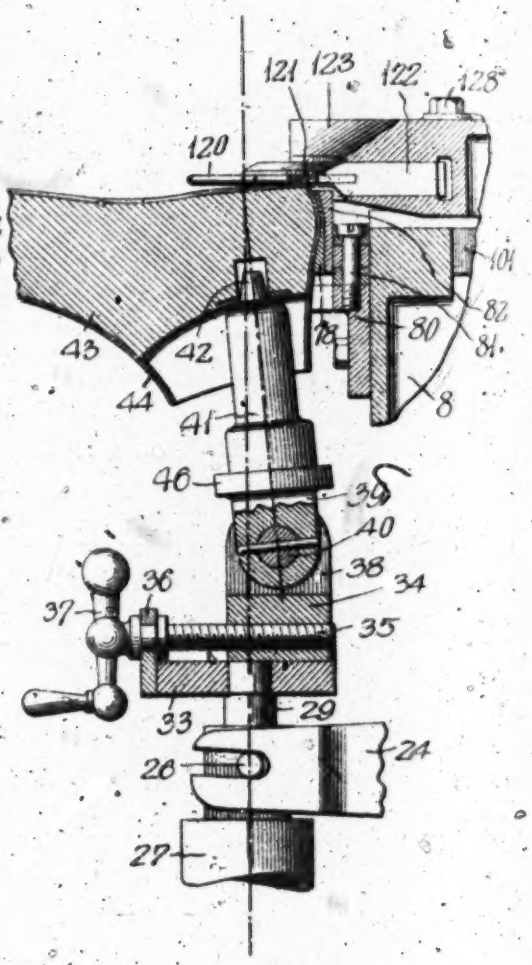


Fig. 13.

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LASTING MACHINE.
APPLICATION FILED DEC. 13, 1915.

1,368,968. Patented Feb. 15, 1921.
9 SHEETS—SHEET 9.

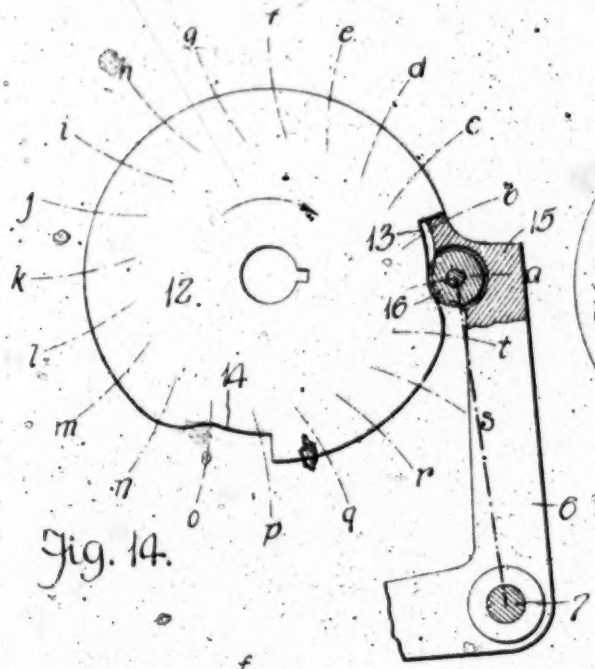


Fig. 14.

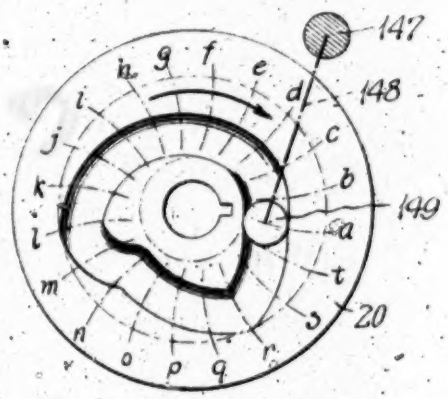


Fig. 15.

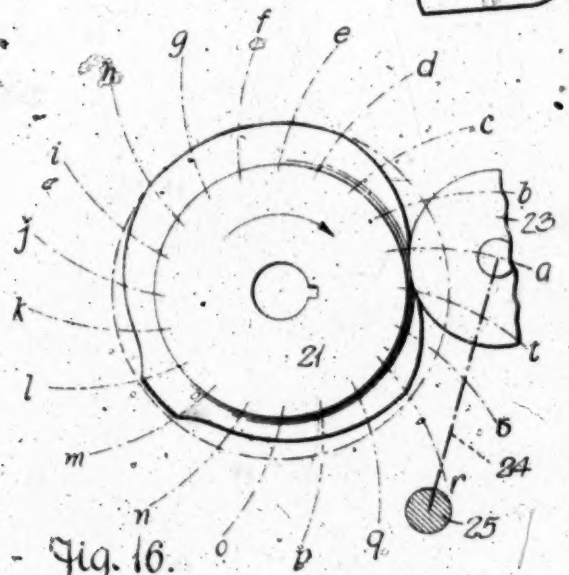


Fig. 16.

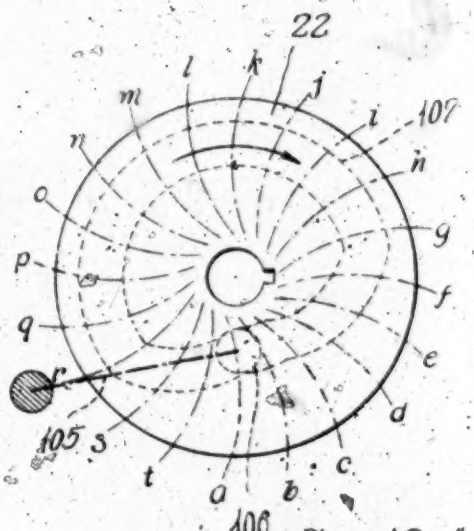


Fig. 17.

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UNITED STATES PATENT OFFICE.

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LASTING-MACHINE.

1,368,968. Specification of Letters Patent. Patented Feb. 15, 1921.

Application filed December 13, 1915. Serial No. 66,486.

To all whom it may concern:

Be it known that I, CHARLES F. PYM, a subject of the King of England, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Lasting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to machines for shaping the uppers of boots or shoes and more particularly, in some of its aspects, to that type of machine in which means are provided for clamping and conforming the shoe upper materials to the sides of a form, for example the shoe last, at one end of the last and for wiping the upstanding edge of the clamped upper at that end of the last over the bottom of the last and compacting it over the sole or insole mounted over the last bottom.

The vertical and longitudinal contours of the sides of lasts will vary at their ends with rights and lefts of the same pattern, and with different patterns of lasts. Consequently, if the upper is to be correctly conformed to the contour of the sides of the last, the clamping or conforming means must be capable of adaptation to these varying contours. This variance is particularly noticeable at the opposite sides of the heel end of the last, the inner side face of which is noticeably undercut in contrast to the rounded outer side face.

In one aspect of the invention, a novel feature resides in improved end clamping mean the construction shown comprising a flexible end embracing band for conforming a boot or shoe upper to one end of its last, and means for forcing said band into last-conforming contact with the shoe upper including a series of pressure members acting against each side of the band and arranged independently to yield responsively to pressure against the band and last in directions automatically to adjust themselves to cause the band to press and conform the upper to the longitudinal and vertical contours of the sides of the last, a common carrier for each series of pressure members, and means for moving said carriers in directions to cause said members to press the upper into conformity with the last. Preferably, these pressure members form a substantially continuous surface to engage the flexible member at opposite sides of the longitudinal median line of the last and shoe. Further, in order that they may conform to the vertical as well as the lengthwise contour of the last, these pressure members are mounted to rock against yielding resistance about axes extending lengthwise of the last for adjustment transversely of the flexible member. Preferably, the pressure members extend across substantially the full width of the illustrated flexible member. The independent bodily movement of the pressure members in directions toward and from the last permits automatic conformation of the members to the lengthwise contour of the sides of the last while the pivotal mounting of these members permits them automatically to conform to the vertical contour of the last sides so that when pressure is applied to the pressure members the flexible member closely conforms the shoe upper to the sides of the last. In some of its aspects, moreover, the invention presents novelty in the clamping means irrespective of the use of a flexible end-embracing member.

In conforming the shoe upper to the last, it is difficult to obliterate through closing pressure, only, of the end embracing means, the wrinkles and inequalities on the face of the shoe upper at the end of the shoe in and about the longitudinal median line of the shoe. A further feature of this invention consists in novel means effective to achieve this result, the construction shown comprising a last support and an opposed member relatively movable to clamp a last between them, with means operated by said relative movement to force the last and shoe upper lengthwise into upper conforming contact with an end embracing means at the end of the last. Preferably, the contact is yieldingly effected and means are also provided to hold the last and shoe in such conforming contact under yielding pressure. The described combinations provide means which will conform the upper materials with precision to the end face of the last, and will clamp the shoe and last against movement relatively to its support so that the smoothing out or conforming pressure is maintained for a sufficient period to make it effective.

A further novel and advantageous feature of the invention consists in opposed members at the top and bottom of a last, respectively connected for simultaneous move-

ment toward each other to clamp the last between them and also connected for simultaneous movement in opposite directions from each other. The connection of these opposed members for simultaneous movement requires but one actuating mechanism and greatly simplifies the timing operation in an automatic lasting mechanism. Further advantage is secured by providing one of these opposed members with a yielding element. This enables the yielding element to be depressed by the non-yielding member, for example to relieve pressure of the yielding element against lasting wipers, and enables reverse movement of the non-yielding member to permit the pressure of the yielding element to operate against lasting means engaged with the marginal portion of a shoe upper over the bottom of the last. Advantageously also, a portion of one of the opposed members, for example, the last supporting member, is pivoted to permit the previously described longitudinal movement of the last in the direction of embracing and conforming means for the upper at the end of the last.

Another important portion of this invention deals with the efficient conformation of the marginal portion of the upper to the edge and the bottom face of the form or last, or of the insole thereon. The margin of the upper, which is presented as an upstanding flange around the end of the shoe, is to be gathered inwardly and compacted to form a seat upon which to lay the outsole and should be molded at the extreme edge of the shoe bottom to present a well defined and permanent edge line and, after the outsole is attached, one wall of a clear straight rand or welt crease. This edge formation has been most difficult to obtain and render permanent, as may be appreciated when it is remembered that the gathering of the flange over the heel seat end of the insole, for example, produces fullness in the form of plaits that increase the effective thickness of the upper stock under the wipers as the wipers advance inwardly over the shoe bottom. It has been necessary, in order to prevent the wipers from shearing off the upper as they advance, to adjust wipers and last supports relatively in such planes that relatively light and ineffective pressure was produced on the low surface at the edge of the heel seat and effective pressure was applied only on the portion of the overwiped flange remote from the edge. I have dealt with this condition in two ways each of which is broadly new in the art as I am advised. One of these important features of this invention comprises novel means for positioning and effecting relative movement of end lasting wipers and a shoe to cause the wipers to wipe the upper smoothly and firmly across the edge of the shoe bottom prior to their wiping action over the shoe bottom this feature in the construction shown being embodied in what may be termed "climbing" wipers which engage the lateral periphery of the shoe with the plane of their wiping faces slightly displaced from the plane of the work at the edge of the shoe bottom and are forced by wedging action of the shoe to climb or ride over the edge of the embraced shoe end in hard frictional contact with the upper and against the resistance of a stiff spring or its equivalent. The organization contemplated by me under this invention, and one example of which is herein fully described, provides for applying around the end of a shoe, for the first time so far as I am aware, heavy wiping or ironing down pressure to the upper being overwiped at the extreme edge of the shoe end, and continuing substantially the same pressure as the wipers advance over the thicker upper materials encountered as they move inwardly from the shoe edge. Preferably the extent of possible yield of the wipers upwardly in order to climb over the edge of the shoe is narrowly limited so that the wipers become unyielding against upward displacement during their inwiping movement. It is an important characteristic of a wiper mechanism organized as described that it is possible to make the wipers frictionally pull the upper tightly over the edge of the insole and insure very snug fitting of the upper around the edge of the insole, for example at the heel seat. This feature of climbing wipers is of particular importance in automatic end lasting or end shaping machinery in which an operator's judgment is not largely available and I intend to limit some claims to an automatic shoe shaping machine characterized by this feature of invention.

It is usually desirable, in order to obtain permanence of shaping of the upper materials over the bottom of a last end, to repeat the wiping operation, under some conditions a number of times, to break down and set the overwiped flange in its new position. A feature of this invention consists in the combination with a climbing wiper of mechanism organized to reciprocate the wiper repeatedly without backing it fully off, or across the shoe edge. My experience indicates that the advantageous effect of a climbing wiper, particularly in an automatic machine, is not enhanced by causing it to repeat its action on the shoe edge.

The second way above referred to in which I have dealt with the conditions presented by the increasing thickness of gathered upper materials as the wipers progress over the shoe bottom is automatically to change the pressure as the wipers advance. In accordance with the illustrated embodiment of this feature of the invention the last is

sustained by means including a very stiff spring, and a holddown, by which the plane of the heel seat is determined relatively to the wipers, is operated to hold the shoe depressed to an initial wiping level at which the heavy sustaining spring is compressed and is caused to rise after the wipers have started inwardly over the heel seat, thereby allowing the heavy spring to press the shoe upwardly with its full strength against the advancing wipers. This organization, by which the pressure is changed automatically during the advance of the wiper, produces the most effective compacting and permanent setting of the overwiped upper materials of which I am aware. The effectiveness of wiping is enhanced, as is well known, by relieving the pressure to prevent drag of the wipers during back strokes, and I preferably connect the holddown with automatic means operating in timed relation with the wipers to depress the shoe or last slightly before the wipers start back and to allow the heavy spring to uplift the shoe or last at a definite point in the advance of the wipers. It is, of course, understood that while the climbing wipers and the shoe moving means are advantageously used together they are not limited to such use.

In operating upon different sizes and shapes of lasts and shoes, it is necessary to adjust the last and shoe supporting means relatively to the upper conforming means and to the wipers so as to present the insole to the wipers in the plane to secure the most effective wiping down pressure by the wipers against the edge of the upper and insole. The last holes into which the supporting last spindle extends are not in uniform angular relation to the heel seats, and the last holes in different sizes of lasts are at different distances from the ends of the lasts; and means for adjustment are necessary to meet these conditions so as to place the sole in the most effective plane relatively to the wipers.

A further feature of the invention consists in novel means for supporting a last in lasting position relatively to the end lasting wipers, the construction shown comprising a member guided for movement toward the wipers and having a last spindle mounted thereon for bodily adjustment relatively thereto lengthwise of the last. Additionally, said member is preferably guided for movement toward and from the wipers in approximately the vertical axis of the last hole, and the last spindle is mounted for bodily right line adjustment on said member lengthwise of the last and comprises a base and a last pin pivoted on the base to tip lengthwise of the last.

Means for bodily lengthwise adjustment of the last pin enables the operator to provide for the differences in distance from the last holes to the ends of lasts; and this adjustment means in coöperation with other means for tilting adjustment of the last pin lengthwise of the last permits the operator to adjust and position the insole in the proper plane for effective wiping down pressure under varying angular relations of the last holes to the plane of the sole and under varying linear relations of the last holes to the ends of the lasts and constitutes a feature of the invention.

In making such adjustments, the last pin in the construction shown may be moved forwardly or backwardly with relation to the supporting member or rod, depending upon the size of the last and the angle of the last hole relatively to the plane of the insole, to locate the pivot of the last pin so that the pin will automatically tip backwardly in the holes of lasts of different sizes and last hole locations and angles in response to upward pressure of the last against the wipers. This condition may be obtained by locating the pivot of the last pin forwardly of the supporting rod with the rod approximately in alinement with the last hole. Vertical movement of the support and holddown to clamp the last and sole between them, or vertical movement or pressure of the last against the wipers when projected over the bottom of the last will therefore tip the last pin backwardly in the last holes of the different lasts and press the end of the last hard against the clamping band.

When the upper materials are stiff and relatively heavy, positive power-effected forward closing movement of the wipers over the heel seat may damage the upper or strain operating parts of the machine. To avoid such consequences, and to improve in general the operation of overlaying means upon a shoe, a further feature of the invention consists in novel controlling and operating mechanism for overlaying means, the illustrative construction comprising novel mechanism to move the wipers yieldingly forward over the heel seat combined with means arranged to permit said wipers to yield upwardly in response to pressure of the shoe materials, this arrangement in the construction shown also permitting the wipers to climb up over the edge of the heel seat as hereinbefore explained. Preferably, the wipers are yieldingly closed over the heel seat as they bodily and yieldingly move lengthwise of the last toward and over the heel seat.

Despite arrangements for adjusting the last and shoe in coöperative relation to the path of bodily wiper movements, the operator will sometimes neglect to avail himself of the adjustments provided and consequently the end of the shoe will be presented at an angle to this path of bodily move-

ment so that the wipers may not always be positioned to conform to the end of the last. To remedy this and other conditions of abnormal resistance to closing movement of a wiper or wipers, a feature of this invention comprises a wiper construction having novel means affording provision for yield in response to resistance to such closing movement, the construction shown embodying pivoted wiper plates supported in carriers mounted for independent wiper closing and opening movements about the pivot of said wipers as a center, the wiper operating means including independent connections to these carriers constructed to yield in response to abnormal resistance to permit automatic relative adjustment of the wipers to the contour and position of the shoe. In the illustrative construction, wherein the wiper closing movements are effected by pinions that move bodily forward with the wipers and are operated by relatively stationary rack bars, provision is afforded for yield of the rack bars each independently of the other when abnormal resistance is encountered by the respective wipers to permit one or both of the wipers to continue its forward movement without corresponding closing movement or to be wedged laterally outward by resistance of the shoe materials.

The described and other features of the invention, including certain novel operating means for clamping the last in position and for operating the end wipers, are more fully described in the following detailed specification read in connection with the accompanying drawings, and in which:

Figure 1 is a front elevation of a machine embodying the present invention, with parts broken away and in section for clarity of illustration;

Fig. 2 is a side elevation of the machine, parts being similarly broken away and in section;

Fig. 3 is a vertical section through the upper part of the machine, on an enlarged scale and with the wipers retracted;

Fig. 4 is a similar view with the wipers partially projected and with the last raised and clamped;

Fig. 5 is a front elevation of the upper part of the machine on an enlarged scale, with certain of the parts broken away and other parts shown in section;

Fig. 6 is a top plan view of the mechanism shown in Fig. 3, with the last and shoe removed and with parts at the rear of the machine broken away to disclose operating mechanisms;

Fig. 7 is a fragmentary transverse section taken on the line VII—VII of Fig. 6;

Fig. 8 is a transverse vertical section taken on the line VIII—VIII of Figs. 3 and 6.

Fig. 9 is a top plan view of the mechanism shown in Fig. 3, the wiper plates and wiper-carrying head being removed;

Fig. 10 is a fragmentary transverse section taken on the line X—X of Fig. 9;

Fig. 11 is a fragmentary transverse section taken on the line XI—XI of Fig. 9;

Fig. 12 is a vertical sectional view of the last supporting means in one position of adjustment relatively to the clamping band and wiper plates;

Fig. 13 is a view similar to Fig. 12 with the last supporting means in a different position of adjustment;

Fig. 14 is a view in elevation, partly in section, of the motion arresting disk and its operated part;

Fig. 15 is a plotted detail of the wiper-head operating cam;

Fig. 16 is a plotted detail of the last jack and holddown operating cam; and

Fig. 17 is a plotted detail of the cam for operating the clamping band.

From a suitably formed base, a column 1 rises upwardly and is crowned by a frame 8 housing part of the operating mechanism. At the top of the column at its rear, a bracket 2 extends rearwardly and upwardly forming a bearing in which is journaled the rear end of a worm shaft 3, and the hub of a power driven pulley 4, loosely sleeved on the shaft. The pulley is cupped to form the cup member of a cone clutch, the cone member 5 of which is sleeved on the shaft 3 for free longitudinal sliding movement and has its sleeve portion formed with the usual annular groove to receive the pins and rolls projecting inwardly from the bifurcated upper arm 6 of a bell-crank clutch shifting lever pivoted to the frame 8 at 7.

Forwardly of the clutch cone and shifting lever, the shaft carries and rotates a worm 9 (Fig. 8) engaging with a worm gear 10 carried by a driven cam shaft 11 journaled in and extending transversely of the frame 8 and having one end projecting outwardly beyond the side of the frame. The worm gear is mounted on this projected portion of the shaft and with the worm 9 is preferably protected from dust and dirt by a suitable inclosing housing (Fig. 8). The extremity of the projected portion of the shaft 11 extends beyond this housing and carries a motion arresting or stop disk 12, having spaced notches 13 and 14 in its periphery forming stop shoulders to be engaged by the end of an arm 15 at the upper end of one of the bifurcations 6, this arm carrying a roller 16 to ride upon the periphery of the disk.

A coiled spring 17 sleeved on the shaft 3 between the two members of the cone clutch operates normally to move the cone member 5 out of clutching engagement with pulley 4 and to position its arm 15 to arrest rotation of the cam shaft 11 when the disk 12 is

tioned to permit the arm 15 to enter into one of the notches 13, 14 under the impulse of the spring which normally presses the roller 16 against the periphery of the disk. The arm 15 is moved out of the disk notch and the clutch thrown in to start or restart the rotation of the cam shaft and the operation of the machine, by means of a rod 18 pivoted at its upper end to the lower arm of the clutch shifting bell crank lever and pivoted at its lower end to a treadle 19 at the base of the column 1. When the clutch is moved and shaft 11 begins to rotate, the roller 16 on arm 15 rides upon the periphery of the disk and holds the cone member 5 in clutching position until the next notch in the disk periphery permits the spring 17 to force the arm 15 into the notch and coincidently to retract the clutch member 5.

The shaft 11, between the walls of the frame 8 carries three disks 20, 21 and 22, effective respectively to control and operate in timed relation the wipers, the last jack and holddown, and the clamping band. The disks 20 and 22 have grooved cam faces and the disk 21, controlling the last jack and holddown, has its peripheral face formed as a cam surface against which bears a roller 23 carried at the rear end of a lever 24 pivotally mounted at 25 on the frame 8 adjacent to its rear end and having slotted bifurcations at its forward end, embracing pins 26 outstanding laterally from the head of a cylinder 27 mounted for vertical sliding movement in guides 28 attached to the front of the column.

A rod 29 extends axially through the cylinder, its lower end being guided in the bore formed in a screw plug 32 closing the lower end of the cylinder and its upper end extending through and beyond the head of the cylinder. A coiled spring 31 is sleeved on the rod within the cylinder 27 with its lower end abutting the screw plug 32 and its upper end acting against a stop collar 30 formed on the rod, and normally tends to move the rod upwardly until the collar 30 engages the head of the cylinder (Fig. 5). The spring 31 acts as a yielding connection between the cylinder 27 and the rod 29 when lever 24 is moved to lift the cylinder and also permits the rod 29 to yield downwardly relatively to the cylinder in response to downward pressure on the rod greater than the strength of the spring.

The upper end of the rod 29 is shouldered down to receive a block 33 which is fixedly attached thereto and which has its upper face provided with a dove-tailed groove therein extending lengthwise of the machine. A similarly shaped rib depending from a superposed block 34 is seated in this groove and is adjustable with the block 34 transversely of the rod 29 lengthwise of the machine by means of a threaded adjusting spindle 35 engaging a threaded bore in the depending rib of block 34 and held against bodily longitudinal movement by a plate 36 held between collars on the adjusting rod and attached to the front edge face of the lower block 33. Preferably, a handle 37 is provided for turning the spindle to adjust the position of the block 34 relatively to the longitudinal axis of the rod 29 and lengthwise of the machine.

The adjustable block 34 is formed with bifurcated upstanding ears 38, in which the lower and enlarged end of a spindle 39 is mounted, the pivot pin 40 to which the lower end of this spindle is secured being journaled between said upstanding ears to permit swinging movement of said spindle in a direction longitudinally of the machine and of a last supported by said spindle, as will be seen. Above its base, the spindle 39 is formed with a collar 46 forming an abutment against which seats the lower end of the coiled spring 45 sleeved on the spindle and engaging at its upper end with a sleeve 41 sliding upon the spindle 39 and having its lower end enlarged to form a housing for the spring 45. This sleeve has its upper end closed and reduced in diameter to form a nib 42 acting as a last pin to engage in the hole or thimble of the last to support the last. This sleeve is loosely held upon the spindle 39 and is guided to slide longitudinally thereon by a pin 47 extending laterally from the sides of the spindle 39 and in alined vertical guide slots 48 in the sleeve 41.

The pivot pin 40 of the spindle is extended beyond the ears 38 at one side of the block 34 and enlarged in diameter to receive the hub of a depending ratchet plate 49. This hub is rigidly connected to the pin and has loosely sleeved thereon the upper end of an arm 51 carrying on one side a pivoted dog or pawl 50 positioned to engage the ratchet plate 49 to lock the pin 40 and the last spindle against forward swinging movement. This dog 50 has a tail 52 extending through and guided by a vertical slot formed in a plate 53 depending from the front of the frame. A coiled spring 54 normally tends to swing the forward end of the dog 50 into engagement with the ratchet 49. In the lowered position of rod 29, the tail of the dog engages the plate 53 at the lower end of the slot and swings the forward end 50 of the dog out of engagement with the ratchet 49, permitting the last spindle 39 to be swung forwardly with its last. When the rod 29 is raised to clamp the last with its shoe upper, as will be later explained, the tail of the dog will be moved clear of the lower end of the notch and the forward end of the dog 50 will coöperate with the ratchet 49 to hold the last spindle against forward swinging movement.

The last spindle is arranged to be swung

rearwardly on its pivot 40 coincidently with the raising of the last supporting rod 29 and through the actuation of the means for so raising the rod. The lower end of the arm 51 which carries the dog 50, is pivotally connected by link 55 to the upper end of a bell crank lever 56 pivotally mounted on a pin 57 projecting from the side of the frame 8. This lever has its rear end pivoted to a block 60 slidably mounted upon a rod 58 having an enlarged upper end pivotally connected at 59, to the cam actuated lever 24. A coiled spring 61 is sleeved upon the rod 58 below the block 60 and engages said block and an adjusting nut 62 on the lower end of the rod. Upward movement of the forward end of lever 24 to lift the last supporting rod 29, will, through the yielding connections afforded by rod 58, spring 61 and bell crank lever 56, tend to rock, the arm 51 in a direction to cause the dog 50 to swing the engaged ratchet and the last supporting spindle 39 rearwardly of the machine and in a direction toward the heel end of a last supported upon the spindle. If opposition to this rearward movement of the last spindle is encountered which is greater than the force of the spring 61, the rod 29 will be moved upwardly without any rearward swinging movement of the last spindle, the rod 58 sliding upwardly through the block 60 and compressing the spring 61.

At opposite sides of the front of the machine bearing brackets 63 are secured to the column 1 and to the frame 8 in vertical alinement. Complemental bars 64 are guided in these bearings and are connected for simultaneous upward and downward movement by pivoted links 65, whose adjacent ends overlap and are slotted conjointly to embrace pin 66 laterally outstanding from the cylinder 27. The outer ends of these links are also slotted and engage outstanding pins 67 at the lower ends of the bars 64. Upward movement of the cylinder 27 through the cam actuated movement of the lever 24 will effect through these connections, simultaneous movement of the bars 64 in the opposite direction—*i. e.*—when the cylinder moves upwardly the bars move downwardly and vice versa.

The upper ends of the bars 64 are bridged by a cross piece 68 having a centrally disposed and rearwardly extending arm 69 which is formed at its rear end with a vertical bore 70 threaded at its upper end to receive a threaded sleeve 74. The reduced upper end of the shank portion of a rod 71, having its lower and enlarged portion terminating in a holddown member or foot 72, extends upwardly through the sleeve and is maintained in determinate relation thereto by a collar 75 which rests on the flanged upper end of the sleeve. The reduction in the diameter of the rod 71 provides a shoulder 73 which is maintained against the lower end of the sleeve 74 by the collar 75. Obviously the holddown may be adjusted vertically by turning sleeve 74. To prevent turning movement of the holddown a longitudinal slot is provided in the lower enlarged portion of the rod 71, and a pin 76 engaging in this slot prevents such rotation. Preferably, a lock nut 77 is employed in conjunction with sleeve 74 to fix it in adjusted position. The holddown 72 is preferably positioned substantially in vertical axial alinement with the rod 29 to engage the sole or insole on a last seated on the last pin 42 to clamp the last between it and the last supporting means when said means with the last is raised and a corresponding downward movement is imparted to the holddown through the medium of the bars 64 and links 65. It is evident that the cylinder 27, rod 29, and spindle 39 with its sleeve 41, form a jack to support the last in position for lasting, and that by means of the block 34 the spindle may be adjusted forwardly or rearwardly relatively to the vertical axis of the rod to cause it in operation to assume different positions about the axis of the pivot pin 40 to incline the bottom of the last and shoe sole at varying angles to the lasting devices, as illustrated by Figs. 12 and 13. As suggested also by Fig. 12, the block 34 may be so adjusted as to cause the last pin or spindle to incline rearwardly toward the heel band when the shoe is in position for the operation of the wipers, thus rendering the downward pressure of the wipers on the heel seat effective with a tendency to tip the spindle and the shoe still farther rearwardly and assisting in seating the shoe firmly against the rear end portion of the band during the lasting operation.

The inverted last when mounted on the last pin 42 of the last spindle in the usual manner, is designed to be engaged by an end embracing band which clamps and conforms the upper to the sides of the last at one end,—as shown herein the heel end of the last,—and holds the last with its shoe upper and insole for the operation of the lasting wipers. A bracket plate 80 is secured to the front face of the frame 8 adjacent to its upper edge to receive a pin 81 which serves pivotally to interconnect the overlapped rear ends of carrier members or plates 79. The inner edges of the carrier plates adjacent to their point of pivotal connection are curved to correspond substantially with the contour of the rear of the last and shoe and have attached thereto and upstanding therefrom similarly shaped pressure members 82. From the forward or outer ends of the conforming or pressure members 82 outwardly, the carrier plates 79 are cut away transversely of the machine. Positioned within these cutaway portions

of the carrier plates are a series of pressure members 83 pivotally mounted between the bifurcated forward ends of plungers 84 by means of transverse ears 85 and pivot pins 86. The plungers 84 are guided in transverse bores in the carrier plates and the pressure members have downwardly extending arms 87, slotted at their outer ends to embrace rods 88 secured to and depending from the carrier plates and having flanges 89 adjacent their upper ends, against which the outer ends of the depending arms 87 are held by coiled springs 90 sleeved upon the rods between the arms 87 and adjusting nuts 91. The series of pressure plates 83 will be positioned at opposite sides of the last and shoe upper and will extend longitudinally of the shoe upper and form a substantially continuous pressure surface at the opposite sides of the shoe, and in conjunction with the pressure members 82, form a substantially continuous pressure surface which will extend around the side of the shoe and last at one end of the last. The pivotal mounting for the pressure members 83 enables these members to turn upon substantially horizontal axes to conform to the vertical contour of the sides of the last and shoe. They are independently adjustable toward and from the opposite side faces of the last by means of threaded sleeves 94 screwing into the outer ends of the transverse bores in the carrier plates 79, these sleeves coöperating also with nuts 95 to vary the tension of coiled springs 93 sleeved on reduced sections 92 of the plungers 84 between the adjusting sleeves and the enlarged inner ends or heads of the plungers. A flexible U-shaped clamping band 78 is attached to the series of pressure members 83 in any suitable manner, preferably by means of screws 96 inserted in the pressure members from the clamping band at points adjacent to its lower edge. Preferably, the lower edge of the band is channeled to provide a flap to cover the head of attaching screws 96 and to prevent injury to the upper materials. The clamping band is yieldingly connected with the end pressure members 82 by means of screws 97 attached to and extending from the clamping band through bores in the pressure members 82 and carriers 79. The carrier plates are each counterbored to provide a socket in which a coiled spring 99, sleeved about the shank of the screw 97, is held by a nut 98 threaded upon the outer end of the screw 97 and serving yieldingly to hold the clamping band to its seat. This yielding connection permits the band to move away from its seat on the conforming plates 82 when the band is fully opened. Coiled springs 100 attached to the outer rear edges of the carrier members 79 and anchored to the sides of the frame 8, normally hold the carrier plates with the clamping band in fully opened position.

The rear edges of the carrier plates are inclined outwardly and forwardly to form wedge faces and are engaged at opposite sides of the pivot point 81 by rollers 102, at the forward ends of spaced and complemental thrust bars 101, guided for longitudinal reciprocating motion lengthwise of the machine by screws 103 (Fig. 9) seated in the frame 8 and extending through longitudinal guide slots formed in the thrust bars. The rear ends of the thrust bars are formed as rods which project through bearings in a cross bar 104 of the frame. These thrust bars are reciprocated toward and from the rear edge of the carrier plates 79 by means of a bell crank lever 105 (Fig. 4) journaled between the sides of the frame 8 below the thrust bars and having one end provided with a roller 106 seated in a cam groove 107 formed in the face of the cam 22. The other and upper end of the bell crank lever is formed with teeth to engage a segmental gear 108 attached to a rock shaft 109 journaled in the sides of the frame 8.

Two arms 110 are mounted upon the rock shaft in laterally spaced relation and have their upper ends bifurcated loosely to engage pins 111 projecting laterally from the forward ends of a yoke 112 (Figs. 4 and 9) from which spaced rods 113 extend rearwardly through suitable bearings in the frame 8 and freely through openings in a cross bar 114 spaced from the rear of the frame 8. The ends of the rods are engaged by adjusting nuts 115 at the rear side of the cross bar and coiled springs 116 are sleeved on the rods 113 between the rear of the frame 8 and the forward face of the cross bar and offer yielding resistance to the forward movement of the cross bar. The tension of these springs may, obviously, be adjusted through the nuts 115. The rods projecting rearwardly from the thrust bars 101 likewise project and slide freely through sleeves 117 threaded into opposite ends of the cross bar 114 and yieldingly connected with the rods of the thrust bars by coiled springs 118 sleeved upon the rods between the forward flanged heads of the sleeves 117 and collars 119 fixed to the rods.

When the disk 22 is turned and the bell crank 105 is rocked through the operation of its cam groove 107 to turn the rock shaft 109 through the medium of segmental gear 108, the arms 110 are rocked to move the yoke 112 longitudinally toward the carrier members 79 and through the rods 113 and their connections with the cross bar 114 to operate the cross bar to move the thrust bars 101 forwardly and close the carrier frames and clamping band, compressing the coiled springs 116, 118, the latter transmitting

pressure yieldingly to the members 79, and tensioning springs 100, so that when permitted by the cam groove 107, these springs will act to retract the thrust bar rollers 102 and to open the carrier plates 79. The length of the stroke of the thrust bars and, therefore, the closing movement of the carrier plates is adjusted through the nuts 115, and the yielding pressure brought to bear against the rear edges of the carrier plates by the thrust bars may be varied for each carrier plate independently through adjustment of the sleeves 117.

When a last with its shoe upper and insole is mounted upon the last spindle 42, and the machine started to cause rotation of the cam disk 22 and closing movement of the carrier plates 79, not only will the carrier plates be yieldingly closed, but the pressure members 83 will clamp the shoe upper at the sides of the last under yielding, conforming pressure through the springs 93, so that the upper is conformed to the longitudinal contour of the last, and the pivotal mounting of these pressure members causes them automatically to rock during the closing movement of the clamping band automatically to conform the clamping band and shoe upper to the vertical contour of the sides of the last. The springs 90 normally hold the pressure members against rocking movement so that closing pressure of the carrier members 79 causes these pressure members to rock on their pivots in a predetermined direction, their upper portions swinging outwardly and their lower portions inwardly, and only to such extent as is required for conformation to the vertical contour of the last sides, and the springs 90, when compressed by this conforming movement, assist in holding the pressure members in conforming position under tension. This is also true of the springs 93 and 118 which hold the pressure members in conformation to the lengthwise contour of the last sides under spring tension. It will be evident that the members 79, by reason of their pivotal mounting at the end of the shoe, have a component of forward movement at the sides of the shoe, and that the pressure members 83 thus receive a slight forward movement in the closing of the band which assists in drawing the upper tightly about the heel end of the last.

The clamping band 78 is designed to engage and clamp the upper against the sides of the last from a line adjacent to the bottom face of the last transversely of the sides of the last for a substantial distance and preferably for substantially the full width of the sides of the last corresponding to the counter portion of the shoe, the band engaging the sides of the upper first adjacent to the shoe bottom and then closing in against the tension of the springs 90 into conforming relation to the contour of the last.

When the last is mounted upon the last pin 42 the last spindle is swung forwardly to clear the holddown so as to permit the last to be inserted upon the last pin 42 without interference by the holddown and the spindle is then swung rearwardly by the operator, downward pressure being exerted to cause the light spring 45 to yield to permit the bottom of the insole to be brought beneath the holddown. When the rear end of the shoe is brought into engagement with that part of the band which is on the conforming plates 82, downward pressure is discontinued and the spring 45 will act to move the last upwardly approximately to lasting position. The treadle 19 is then operated to start the machine, whereupon, the cam 22 effects the closing of the clamping band 78, and the shoe is jacked and positioned for the lasting operation as will be explained more in detail hereinafter.

Subsequent to the clamping of the last and shoe, end lasting wipers are projected up and over the bottom of the last to break down the upstanding marginal portions of the shoe upper over the bottom of the insole and to compact the broken down portions over the bottom of the insole.

This end lasting mechanism is carried by a head or wiper carrier 123 having a rearward extension 141 provided with a longitudinal channel 140, at and within the forward end of which is seated an ear 139 having a stem 142 extending loosely upward through a bore in the head and having its end screw threaded to engage in a threaded bore in the upper end of an inverted cup 143 housing a coiled spring 145 sleeved upon the stem 142 between the top of the head 123 and the upper or closed end of the inverted cup 143. The bottom edge of the cup is spaced above the top face of the head 123 a sufficient distance to permit a determinate maximum compression of the spring 145 by upward movement of the wiper head 123. Preferably, a nut 144 is provided to assist in holding the cup 143 in adjusted position. The ear 139 supports the forward end of the wiper head through the pivotal connection thereto of the upper forked end of a rock arm 138 journaled upon the rock shaft 109 for free turning movement thereon.

The rear end of the extension 141 of the wiper head is supported by a forked arm 146 secured upon a rock shaft 147 which is mounted in bearings in the sides of the frame 8 near its rear end and has a downwardly extending rigid arm 148 carrying a roller 149 at its extremity riding in the cam groove 150 of the cam disk 20. The forked upper end of the arm 146 embraces a link 151 lying within the channel 140 of the rearward ex-

tension of the wiper head and is pivotally connected to the rear end of said link by a pin 152 passing through the link, the forked arms and into elongated horizontal guide slots (Fig. 6) in the side walls of the channel 140. The forward end of the link 151 terminates at a point rearwardly of the ear 139 and is connected to the extension 141 by a transverse pin 154 extending through the end of the link and guiding in horizontal elongated slots alined with the slots 153 in the side walls of the extension and similarly designated. The pins preferably have a relatively loose fit in the slots to provide for slight relative vertical movement between the pins and the slots. The arms 138 and 146 which support and operate the wiper carrying head 123 are substantially parallel, as shown in Figs. 3 and 4 and thus tend to maintain the wipers in substantially uniform angular relation to the plane of the shoe bottom, the wiper head, however, being permitted to swing yieldingly about the pin 152 as an axis against the tension of the spring 145 in response to resistance of the shoe materials.

The link 151 is provided with an integral, rearwardly extending rod 155 (Figs 4 and 6) guided through the rear wall 156 of the wiper head and having its end threaded to receive an adjusting nut 158 acting against the rear end of a coiled spring 157 sleeved on the rod 155 between the rear face of the wall 156 and said nut. This spring provides a yielding connection between the wiper operating disk cam 20 and the wiper head 123, so that in the event of substantial opposition to forward movement of the wipers carried by the wiper head, the spring 157 may yield to prevent damage to the operating parts.

The wipers are in the form of pivotally connected plates 120 having inner formed edges to approximate the outline of the end portion of the last when they are closed upon the last. The rear ends of these plates overlap and are pivotally interconnected by a pivot pin 121 located adjacent to the inner edge of the plates and approximately in the vertical plane of the longitudinal median line of the last. These wiper plates are mounted and held within horizontal slots in the forward edges of wiper carrying members 122 which, in turn, fit and slide freely within similarly formed recesses in the forward end of the wiper carrying head 123.

The outer or rear edges of the wiper plates are formed substantially semi-circular in plan view when the plates are in open position and the slots in the carrier members which receive the wipers are similarly formed.

The wiper plates are removably held in their carrier members by vertical pins 124 (Fig. 6) carried by the carrier members and extending through and engaging the inner ends of curved slots, formed in and extending inwardly from the outer edges of the wiper plates so that the pins permit limited turning movement of the wiper plates in either direction relatively to their carrier members. The wiper plates may be readily removed from their carrier members by removing the retaining pins.

The rear edges of the carrier plates 122 are formed substantially semi-circular in plan view and are provided with teeth which form gear segments 125 arranged to be engaged by pinions 126 located in suitable recesses in the head 123. The groove or recess in the wiper head which receives the carrier members 122 is shaped to conform to the semi-circular form of these members which are loosely held to turn freely in the head by means of screws 127 in the head passing down through slots in the carrier members formed on arcs concentric with the pivot 121 of the wiper plates.

To rotate the pinions 126 and the connected gear segments 125 of the carrier members while the wiper head is being projected bodily forward toward the end of the shoe, each of the pinions 126 is mounted upon a stud 128 (Fig 8) and also carries a smaller and superposed pinion 129 mounted on a hub of the pinion 126 to turn therewith. These studs and pinions are located at opposite sides of the wiper head. Complemental rack bars 130, also located at opposite sides of the head are guided therein for engagement with the pinions 129. These rack bars are substantially stationary relatively to the reciprocating wiper head, so that through the rack bars, rotary motion is communicated to the pinions 129 and 126 and thence to the wiper carrier gears 125 to close and open the wiper plates as the wiper head is moved toward and from the end of the shoe.

Preferably, the rack bars are yieldingly held against movement with the wiper head in wiper projecting direction since it is desirable to permit the wipers to yield more or less in case abnormal resistance is encountered due to the character of the upper materials or to improper adjustment of the shoe positioning means or wiper mechanism. Accordingly, rods 131 are connected to the rear ends 130 of the rack bars by links 132, these rods having collars 135 formed adjacent their forward ends and extending through bores formed in exteriorly threaded sleeves 133 adjustable in interiorly threaded ears 134 rigidly attached to and upstanding from the sides of the frame 8 (Figs. 2 and 8).

The extremities of the rods 131 extend beyond the rear ends of these sleeves and are threaded to receive adjusting nuts 137 between which and the flanged rear ends of the sleeves coiled springs 136 are sleeved

upon the rods yieldingly to hold the rack bars 130 against forward movement with the wiper carrying head while the collars 135 abutting the opposite ends of the sleeves 133 positively resist rearward movement of the rack bars 130 with the wiper carrying head when it is retracted away from the shoe.

Consequently, in the forward closing movement of the wiper head, the wipers are yieldingly moved against the marginal portions of the upper to avoid damage to the operating parts through unusually heavy resistance to breaking down action of the wipers, while on the reverse movement of the parts when no resistance is encountered, the movement of the wipers is positive.

If for any reason the shoe should be presented to the wipers with the longitudinal median line of its heel end portion at an angle to the path of bodily movement of the wipers, it will be evident that the wiper at one side might encounter abnormal resistance to its closing movement by reason of premature engagement with the shoe. In such an event the yielding wiper operating connections above described permit the closing movement of such wiper to be retarded, the corresponding rack bar 130 being carried along with the wiper against the tension of the spring 136 in the continued movement of the wiper lengthwise of the shoe, while the wiper at the other side continues its normal closing movement, until such time as change in relation between the resistance of the spring 136 and that of the shoe materials permits the first wiper to resume its closing movement. It will be evident, moreover, that the arrangement of the rack bar and the spring may permit the wiper to be moved reversely by wedging action of the shoe during the movement lengthwise of the shoe if such abnormal resistance is encountered. The independently yieldable connections to the wipers thus provided permit the wipers to adjust themselves relatively substantially about their axis of closing movement in conformity to the contour and position of the shoe.

In the event that extreme resistance is encountered to the closing movement of both wipers, the springs 136 will yield and will permit the rack bars 130 to move with the wiper head, the gears 129 and 126 remaining stationary during the yielding movement of the springs or turning reversely due to wedging action of the shoe, thus stopping the closing movement of the wiper plates or permitting them to be partially retracted. Obviously, the tension of the springs 136 may be varied by adjustment of the nuts 137. The sleeves 133 permit independent adjustment of each of the rack bars 130 in a longitudinal direction in order to effect adjustment of the wiper plates for last ends of substantially variant contour.

In the retracted position of the wipe and their carrying head, the arms 138, supporting said head are positioned so th their upper ends are beyond the dead ce ter line of their swinging movement, or other words are rearwardly of vertical lin drawn perperdicularly to the axes up which they turn. Therefore, when the a 146, and consequently arm 138, is rock through the action of the cam groove in t disk 20 to move the wiper head forward toward the end of the shoe, the wiper he will be slightly elevated, the movement b ing in a direction lengthwise of the machi and toward the end of the shoe and havi a relatively slight upward component. T path of movement will, therefore, be u wardly inclined until the pin 152 and t pin connecting the arm 138 to the ear 1 reach the dead center of the swing of the arms 146 and 138, which point is reach approximately at the time the wipers enga the upper and press it against the last, aft which the forward projecting movement h a slight downward component.

The last, shoe upper and insole are pos tioned by the initial jacking movement that the plane of the lower face of the wipe 121 in retracted position is below the pla of the insole on the bottom of the last a preferably slightly below the plane of t bottom of the last. The forward projecti movement of the wiper head will move t wiper plates 121 forwardly and close the into contact with the shoe upper substa tially or approximately at the line of merg between the side of the last and the botto of the last.

The forward projecting movement of th wiper head will continue, and the edges the wipers engaging the upper materia frictionally draw the stock and by the wedg ing action of the stock are forced to climb up over the edge of the insole as they a advanced forwardly and closed, this climb ing action, which serves to draw the upp materials tightly up over the edge of the in sole, being permitted by reason of the up ward yielding of the wiper head against th tension of spring 145. This yielding move ment results in the compression of the sprin 145, so that the wiper plates move over th edge of the insole with the force of th tensioned spring 145 acting downward against the wipers and aiding to break dow and compact the upper materials over th edge of the insole.

This downward pressure is in a directio substantially perpendicular to the bottom o the insole, and in cooperation with simila upward pressure exerted by the last jack t force the edges of the upper against th bottom faces of the wipers, as will be late explained, is effective thoroughly to iro down and thoroughly to compact the over

worked marginal portions of the shoe upper materials.

The cam groove in the disk 20 is constructed preferably to advance the wipers over the bottom of the insole and partially to retract the wipers, the operation of the machine being automatically stopped at this point to permit the insertion of lasting tacks; subsequently the wipers are again advanced and finally retracted. The operation of the last jacking, shoe clamping and wiper operating mechanism in their timed relation will now be described.

As an aid to understanding the timed relation of the parts, reference is made to the plotted cam paths of the wiper operating, last jacking and clamping band controlling cams, and the motion arresting disk disclosed in Figs. 14 to 17 of the drawings, in which the time periods are divided into twentieths, the division lines being lettered consecutively *a* to *t*, inclusive, in a direction opposite to that of rotation of the cams, the motion arresting disk 12 being divided in like manner to show the relation of its stop notches to the cams.

In the operation of the machine, the pivoted last spindle is first swung outwardly from beneath the holddown 72, (the pawl 50 being released by engagement of its arm 52 with the plate 53 at the lower end of its slot when the machine comes to rest at the end of a cycle), and a last with its shoe upper and insole thereon is mounted in inverted position on the pin 42 of the last spindle with one end, in the present showing the heel end, of the last and shoe upper toward the rear of the machine to be operated upon by the clamping and wiping mechanisms for lasting the heel seat. The last pin being yieldingly supported, may be depressed to enable the last to be mounted on the pin without catching the lower edge of the upper on the pin and pulling it into or against the last thimble.

The last spindle with the last and shoe are then swung rearwardly toward and it may be loosely against the rear end of the clamping band 78, the last spindle being pressed downwardly against the tension of its spring 45 to clear the holddown as the end of the last is moved beneath and beyond the holddown. The last is now released and will be positioned by the spring 45 with its insole above the plane of the wipers and below the holddown as suggested in Fig. 3.

The adjusting screw 35 may now be operated, if necessary, to position the shoe sole at a desired inclination relatively to the plane of the wipers. When the end of the last to be operated upon is substantially different in contour from that or those previously operated upon by the machine, the contour of the wipers may be quickly adapted to the change of contour by turning the sleeves 133 controlling the rack bars 130. No corresponding adjustment of the clamping band 78 is usually necessary since this band tends to conform itself to different contours of last ends, but if conditions require such adjustment it may be effected as hereinbefore described.

These preliminary steps having been taken, the cycle of the machine may now be started by operating the treadle 19, retracting the stop member 15 and throwing in the clutch to start the rotation of the cam shaft.

When the machine is started, the cam disk 21 first becomes active, lifting the jack rod 29 upwardly and coincidently pressing the last spindle backwardly toward the clamping band. The upward movement of the spring cylinder 27 causes the holddown 72 to move downwardly to engage the insole and finally depress the last and its rod 29 slightly to position the surface of the insole above the plane of the wipers with the jack spring 31 under tension and with the last spindle yieldingly held by pawl 50 in its backwardly swung position. These actions occur during the first three intervals ("*a*" to "*d*," inclusive) of the cycle and the parts are maintained in this relation by their cam 21 until the wipers start their closing movement. It will be noted by reference to Fig. 4 that as the parts are thus positioned the sleeve 41 is seated against the collar 46 and the shoe is upheld through the tension of the spring 31 against the holddown 72 the position of which is positively determined by its operating connections.

During the above described operation of clamping the shoe, the cam groove in cam disk 22 is practically inactive and only begins to act to close the clamping band 78 about the end of the last and shoe upper as the holddown approaches the limit of its downward movement. As plotted (Fig. 17) the cam groove 107 in the cam disk 22 begins to act against the clamping band to close the clamping band in the third interval of the cycle, the closing movement, as plotted, commencing at the end of the second interval "*c*" and ending during the sixth interval, the clamping band remaining fully closed from this point on until near the end of the cycle when the wipers start on their final retracting movement.

Up to the time that the clamping band reaches fully closed position the cam groove in the wiper cam disk 20 has been concentric and has not acted against the roll 149 and lever 148 to operate the wipers. As the clamping band reaches fully closed position, however, a rise in the cam groove acts against the roll and lever to move the wiper head 123 forwardly to project the wipers over the edge of the insole, the racks and pinions operating to close the wipers as they climb up over the edge of the insole and are tensioned

downwardly to break down the upstanding marginal portion of the upper.

As the wipers begin to close over the edge of the insole, the jack cam 21 acts to lower the spring cylinder 27 and coincidently to lift the holddown 72 so that the tension of the compressed jack spring no longer is taken by the holddown but is effective to force the marginal portion of the upper against the faces of the closing wiper plates 121 with compacting pressure acting substantially perpendicularly to the plane of the wipers and insole, opposing the downward compacting tension of spring 145 on the wiper plates and it may be, raising the shoe to take up the vertical yield of the wipers to hold the wipers rigidly against vertical displacement during their further advance so that the combined and maximum downward and upward compacting pressures act upon the marginal portion of the upper during the first closing movement of the wipers when maximum compressive force is needed to "break down" the upper.

The closing movement of the wipers, as plotted, occurs in the time intervals between "*g*" and "*l*" of the movement of wiper cam 20 and the transference of the jack spring tension occurs in the intervals between "*i*" and "*l*", representing the movement of the wiper plates inwardly over the edge of the insole. As the wipers approach the limit of their closing movement the jack cam 21 acts to move the jack spring cylinder 27 upwardly, further tensioning the jack spring against the wipers and coincidently lowering the holddown 72 to engage the insole and to take the pressure of the jack spring off the wipers so as to prevent drag on the wipers as they retract.

This last point is reached at the limit of closing movement of the wipers, the position of the holddown being maintained by cam 21 during the next interval ("*l*" to "*m*") of cam movement, during which the wipers are retracting reaching the limit of a first (and partial) retracting movement at the end of the following period ("*m*" to "*n*") of cam movement. During this following period the jack cam 21 lowers the jack spring cylinder 27 and lifts the holddown so that the compressed jack spring again acts against the face of the wiper plates which have been only partially withdrawn and are still projected over the edge of the insole. Pressure of the wipers against the last, acting against the pivoted last pin, holds the end of the last hard against the clamping band.

The cam groove in wiper cam 20 is practically inactive to close the wipers during the next interval ("*n*" to "*o*") at the end of which notch 14 on the motion arresting disk 12 is alined with the roller 16 on arm 15, which is forced into the notch by its spring, stopping further rotation of the cam shaft 11 as previously described. When the operation of the machine is thus arrested, the wipers are partially retracted from their first advance and are about to close over the insole for a second wiping movement and the jack cylinder 29 has been lowered and the holddown lifted, thereby again putting the upward pressure of the tensioned jack spring against the faces of the wipers.

This point or halt in the cycle may be utilized for the insertion of lasting tacks to fasten the edge of the wiped over marginal portion of the shoe to the insole, although it is within the province of the invention to arrange the notch 14 in the disk 12 to cause the motion arresting action at a different and later stage of the operation such, for instance, as when the wipers are finally retracting but before they are withdrawn from over the edge of the insole.

Assuming that the lasting tacks are inserted in this interval the machine is again started by operating the treadle 19. The wipers are now again closed fully over the insole with upward compacting pressure against the wipers by the jack spring and with downward pressure against the wipers from the spring 145 of the wiper head, this pressure being slightly reduced since the marginal portion of the upper has been "laid down" over the edge of the insole by the first closing movement of the wipers so that in the preceding retraction and in the present (and second) closing movement, the upward pressure of the insole and overlaid upper against the wipers is reduced. As the wipers approach their limit of closing movement the jack cam again acts to lower the holddown and relieve the pressure of the jack spring against the wipers, as shown in Fig. 16.

The wipers reach the limit of their second closing movement at the end of period "*q*"—"*r*" in the cam plot and immediately start to retract. Coincidently the groove in the clamping band cam 22 acts to open the clamping band which is fully opened by the time the wipers are fully retracted beyond the edge of the insole. Coincidently with retracting movement of the wipers and opening movement of the clamping band, the jack cam 21 acts to relieve upward pressure against the wipers by lowering the spring cylinder 27 to its initial position at the beginning of the cycle, this position being reached when the wipers reach fully retracted position. As the jack rod 29 reaches the limit of its downward movement, the tail 52 of the pawl 50 strikes the plate 53 at the lower end of its slot and releases the pawl so that the last spindle 35 is automatically released and falls forwardly by gravity to a convenient position for the removal of the last and shoe. The machine operation is automatically halted

at the end of the wiper retracting, clamping band opening and jack lowering movements by the roller 16 dropping into notch 13 and withdrawing the clutch. The machine is now ready for another cycle of operations similar to that previously described.

A preferred embodiment and construction of lasting devices and their power-operated mechanism has been illustrated in the accompanying drawings and described herein but it will be understood that the construction and arrangement of the parts may be varied within the spirit of the invention and the scope of the appended claims.

The method of lasting shoes exemplified by the "climbing wipers" of the described lasting mechanism and which consists generally, in forming the upper to the sides of the last and down over the margin of the sole on the last bottom by wiping the upper inwardly over the bottom edge of the last and over the margin of the sole by moving wipers upwardly and inwardly over the the margin of the sole against heavy yielding resistance to upward movement producing strong frictional indrawing pressure on the upper at the bottom edge of the last and downwardly compacting pressure on the upper inwardly of said edge, is not claimed herein but forms the subject-matter of a divisional application, Ser. No. 169,749, filed May 19, 1917.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, in combination, a flexible end-embracing band, a series of pressure-applying members acting against each side of said band for substantially its full width and constructed and arranged to yield each independently in response to pressure against the band and last in such direction as to adjust themselves automatically to cause the band to press and conform the shoe upper closely to the longitudinal and vertical contours of the sides of the last, a common carrier for each series of said pressure members in which said members are independently mounted, and means for moving said carriers to apply pressure to the shoe through said members.

2. In a machine of the class described, in combination, a flexible end embracing band, and means for closing said band to conform the shoe upper to the sides of the embraced end of the last including a series of pressure-applying members at each side of the band engaging the band for substantially its full width and operative responsively to pressure against the last and band to tilt about axes extending longitudinally of the band and shoe to force the band and shoe upper into conformity with the vertical contour of the sides of the last, spring means tending to resist such tilting movement of the members, a common carrier for each series of said pressure members, and means for moving said carriers toward the opposite sides of an embraced last end.

3. In a machine of the class described, the combination of an end embracing band, a series of pressure applying members at each side of the band forming a substantially continuous surface longitudinally of each side of the band, a common carrier for each series of pressure members, means for moving said carriers independently of and relatively to the last to cause said members to close the band upon the last, and mountings for said members permitting independent and automatic adjustment of the members against yielding resistance to conform the band and upper to the longitudinal and vertical contours of the sides of the last responsively to pressure of said members against the band and last.

4. In a machine of the class described, in combination, a flexible end embracing band, a series of independent pressure-applying members extending longitudinally of each side of said band and arranged for independent automatic adjustment through pressure to cause the band to conform the upper to the longitudinal and vertical curvatures of the sides of an embraced last end, a common carrier for each series of said members, having yielding pressure-applying connections with each member, and means for moving said carriers toward and from the sides of a last and shoe end within said band.

5. In a machine of the class described, in combination, a flexible end embracing band, and closing means for said band arranged to be operated independently of an embraced last and shoe to force it toward the shoe and including a longitudinally extending series of independently yielding pressure-applying members engaging each side of said band for substantially its full width and constructed and arranged for independent automatic adjustment in different directions responsively to pressure against the last and shoe to cause said band to conform the upper to the longitudinal and vertical curvatures of the sides of an embraced last end.

6. In a machine of the class described, in combination, a substantially U-shaped flexible end embracing band, and band closing means comprising a series of pressure-applying members at each side of said band constructed and arranged for independent automatic adjustment through closing pressure against the sides of the embraced end of a last to cause the band to conform the upper to the longitudinal and vertical curvatures of the sides of the last, a common carrier for each series of pressure members

having yielding connection with each pressure member, and means for moving said carriers and pressure members toward the opposite sides of an embraced last end.

7. In a machine of the class described, in combination, a flexible end embracing band for conforming a boot or shoe upper to the sides of an embraced last end, a series of pressure-applying members at each side of the band, a common carrier for each series of members in which they are mounted independently to yield bodily away from a last and independently to rock against yielding resistance about axes extending lengthwise of a last responsively to pressure against the band and last side, and means for moving said carriers toward and from opposite sides of the last end.

8. In a machine of the class described, in combination, a substantially U-shaped end embracing band, a plurality of pressure-applying members forming a substantially continuous pressure surface extending around substantially the entire band and including a series of independently yielding pressure members at each side of the band, a common carrier for each of said series, springs against which said members are yieldable relatively to their carriers and means for moving said carriers toward and from the opposite sides of the shoe embraced by said band.

9. In a machine of the class described, the combination of a flexible member for conforming a boot or shoe upper to the surface of its last, and pressure members to engage said flexible member to force the upper material into conforming contact with the surface of the last, said pressure members being pivoted to turn about axes extending lengthwise of the flexible member in response to pressure against the last, and resilient means tending to oppose said turning movement in one direction.

10. In a machine of the class described, a flexible end embracing band for conforming a boot or shoe upper to the sides of the embraced end of its last, and a series of pressure members supporting said band and arranged independently to turn against yielding resistance about axes extending longitudinally of an embraced last in response to pressure against the sides of said last, and yielding means tending to resist turning movement of said members.

11. In a machine of the class described, in combination, a flexible end embracing band for conforming a shoe upper to the sides of the embraced end of a last, opposed series of pressure applying members extending longitudinally of the sides of said band at opposite sides of the band, a common carrier for each series of pressure members on which said members are supported independently to swing against yielding resistance responsively to pressure against a last automatically to adjust themselves to the vertical contour of the sides of the last, and yielding means tending to resist such swinging movement of the members.

12. In a machine of the class described, in combination, a flexible end embracing band for conforming a shoe upper to the sides of the embraced end of its last, a series of pressure-applying members at each side of said band, a common carrier for each of said series on which said pressure members are pivotally mounted for independent swinging movements about axes extending lengthwise of an embraced last responsively to pressure against the band and last to conform the band and upper to the vertical contour of the sides of the last, spring means tending to resist said movements of the members in one direction, and means for moving said carriers toward and from the embraced end of the last.

13. In a machine of the class described, a flexible shoe end embracing band, a series of pressure applying members at each side of the band extending from the front end of the band rearwardly, carriers on which said members are supported independently of one another to yield laterally of the shoe, and thrust members movable lengthwise of the shoe in engagement with said carriers to force the carriers inwardly toward the sides of the shoe.

14. In a machine of the class described, a flexible shoe end embracing band, members arranged at opposite sides of said band for closing the band inward laterally of the shoe, said members having outwardly directed faces inclined to the lengthwise dimension of the shoe, and thrust members restrained from movement laterally of the shoe and movable lengthwise of the shoe in wedging engagement with said faces to force said members toward the sides of the shoe.

15. In a machine of the class described, the combination of a flexible member for conforming a boot or shoe upper to the surface of its last, a carrier member, means for moving the carrier member toward or from the side of the last independently of movement of the last, a pressure member attached to said flexible member and supported by said carrier member, and spring means for projecting the pressure member toward the side of the last and shoe upper and relatively to the carrier member.

16. In a machine of the class described, the combination of a flexible members for conforming a boot or shoe upper to the side of its last, a carrier member, means for moving the carrier member toward and from the side of the last and shoe upper, a pressure member supported by the carrier member and pivotally mounted to turn against yielding resistance about an axis

extending longitudinally of the flexible member responsively to pressure against the flexible member and last, and spring means normally to hold the pressure member projecting relatively to the carrier member in the direction of the side of the last and shoe upper.

17. In a machine of the class described, the combination of a flexible member for conforming a boot or shoe upper to the side of its last, and a pressure-applying backing attached to the flexible member by yielding connections permitting the flexible member to move relatively to said backing.

18. In a machine of the class described, the combination of a flexible member for conforming a boot or shoe upper to the side of its last, a pressure-applying backing member having a seat for said flexible member, and a spring connection between the flexible member and the backing member yieldingly to hold the flexible member to its seat on said backing member.

19. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the side of its last at one end of the last, carrier members pivotally connected together closely adjacent to the end of the last and supporting a plurality of yielding pressure members connected to said flexible member, and means for moving said carrier members and pressure members to close the flexible member against the sides of the last and shoe upper at said end of the last.

20. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the sides of its last at one end of the last, carrier members pivotally connected together adjacent to the end of the last and supporting a plurality of yielding pressure members connected to said flexible member, means for moving the carrier members and pressure members to close the flexible member against the sides of the last and shoe upper at said end of the last, and pivoted wiper plates positioned to close over the bottom of the last and having their pivot approximately in alinement with the axis of the pivot of the carrier members.

21. In a machine of the class described, the combination of a flexible member for conforming a boot or shoe upper to the side of its last at one end of the last, carrier members for said flexible member pivotally connected together adjacent to said end of the last, and a series of independent pressure members on each carrier member to press said flexible member against the shoe upper at the sides of the last.

22. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the side of its last at one end of the last, carrier members for said flexible member pivotally connected together adjacent to the end of the last, and a series of independently movable spring pressed pressure members on said carrier members arranged to press the flexible member against the shoe upper at the side of the last.

23. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the side of its last at one end of the last, carrier members for the flexible member pivotally connected together adjacent to said end of the last, and a series of independently movable spring pressed pressure members supported by said carrier members and pivotally mounted independently to turn transversely of the length of the flexible member.

24. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the side of its last at one end of the last, carrier members for the flexible member pivotally connected together adjacent to said end of the last, and means for yieldingly operating said carrier members yieldingly to close the flexible member against the side of the last at said end of the last.

25. In a machine of the class described, the combination of a flexible end embracing member for conforming a shoe upper to the sides of its last at one end of the last, carrier members for the flexible member pivotally interconnected and provided with wedge faces, and means for yieldingly pressing said carrier members and the supported flexible member against the sides of an embraced last, comprising thrust members arranged to act against said wedge faces.

26. In a machine of the class described, the combination of a flexible end embracing band for conforming a shoe upper to the sides of its last at one end of the last, a series of pressure-applying members acting against said band and extending along the opposite sides of the band, and means for transmitting yielding closing pressure to said members, said means including wedge-faced pressure-transmitting members at opposite sides of the longitudinal median line of an embraced last, and thrust rolls acting against said wedge-faced members.

27. In a machine of the class described, the combination of a flexible substantially U-shaped end-embracing band, a series of pressure applying members embracing said band, and means yieldingly to press said members against said band to conform a shoe upper to the sides of its last, said means including wedge faced members at opposite sides of the longitudinal median line of an embraced last and thrust rolls acting against said wedge faced members.

28. In a machine of the class described,

the combination of a flexible member for conforming a shoe upper to the sides of its last, carrier members for the flexible member pivotally connected together adjacent to the end of the last, a series of pressure members on each carrier member independently yieldable transversely away from the last and attached to said flexible member, and means for turning the carrier members upon their pivotal connection yieldingly to close the flexible member against the sides of the last at said end of the last.

29. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the sides of its last at one end of the last, carrier members for the flexible member pivotally interconnected adjacent to said end of the last and each provided with a plurality of transverse bores therein, plungers slidably mounted in said bores, springs arranged to hold the plungers projected in said bores, a pressure member pivotally attached to each plunger and connected to said flexible member, and means for operating the carrier members to close the flexible member against the sides of the last and shoe upper at said end of the last.

30. In a machine of the class described, the combination of a flexible member for conforming a shoe upper to the sides of its last at one end of the last, carrier members for the flexible member pivotally interconnected adjacent to said end of the last, a series of independent pressure members connected to said carrier members and pivotally mounted for independent movements, and means yieldingly to resist the turning of said pressure members about their pivots.

31. In a machine of the class described, the combination of a flexible member adapted to embrace a shoe upper mounted upon its last at one end of the last, a series of pressure members to engage said flexible member at each side of the last at said end to force the flexible member into last conforming contact with the sides of a shoe upper at said end of the last, the pressure members of each series together forming a substantially continuous surface to engage said flexible member, means for pivotally supporting the pressure members, and means yieldingly to resist the turning of each pressure member about its point of pivotal support.

32. In a machine of the class described, the combination of a flexible substantially U-shaped end embracing band for conforming a boot or shoe upper to the surface of a last at one end of the last, and means for forcing said band into last conforming contact with the upper materials independently of movement of a last including a plurality of pressure members forming a substantially continuous pressure surface extending lengthwise along each side of the band and mounted for independent yielding contact with said band to conform the band and upper materials to the surface of the last.

33. In a machine of the class described, the combination of a substantially U-shaped end embracing member for conforming a boot or shoe upper to the side surfaces of a last at one end of the last, and means for forcing said end embracing member into last-conforming contact with the upper materials independently of movement of a last including a plurality of spaced independent pressure applying members at opposite sides of the longitudinal median line of the last arranged to be engaged with the end embracing member under pressure and independently to yield to conform the end embracing member and upper materials to the side surfaces of the end of the last.

34. In a machine of the class described, the combination of end embracing means arranged to be operated to embrace and conform a shoe upper to the sides of its last at one end of the last, a last support and an opposed member relatively movable to clamp a last between them, and means operated by said relative last clamping movement of the parts to force the last and shoe upper lengthwise in upper conforming contact under substantial pressure with said end embracing means at the extremity of the last.

35. In a machine of the class described, the combination of means for embracing and conforming a shoe upper to the sides of its last at one end of the last, a last support, a member to oppose the last support, means for relatively moving said support and opposed member to clamp the last between them, and means operated by such relative movement of the support and opposed member to move the last and shoe upper lengthwise in a direction to force the shoe upper into contact with said conforming means.

36. In a machine of the class described, the combination of means for embracing and conforming a shoe upper to the sides of its last at one end of the last, a last support, a member to oppose the last support, means for relatively moving said support and its opposing member to clamp the last between them, and means operated by said means for relatively moving the support and member yieldingly to force the last endwise toward said conforming means.

37. In a machine of the character described, the combination of means for conforming a shoe upper to the sides of its last at one end of the last, opposed members relatively movable toward each other to clamp a last between them, mechanism for moving said members to clamping position, and means organized automatically to force the last in the direction of its length and to-

ward said conforming means responsively to movement of said mechanism to clamp the last.

38. In a machine of the class described, the combination of means for conforming a shoe upper to the sides of its last at one end of the last, clamping means to support and hold the last including members relatively movable toward and from each other and constructed and arranged to force the last in the direction of its length toward said conforming means at said end of the last, and means for operating said members to clamp a last between them and coincidently to move the last lengthwise of the conforming means, said clamping means being arranged to yield lengthwise of the last to provide a yielding contact of the shoe upper with said conforming means at the extreme end of the last and shoe upper.

39. In a machine of the class described, the combination of end embracing means arranged to be operated to embrace and conform a boot or shoe upper to one end of a last, a last support and an opposed member relatively movable to clamp a last between them, means to effect relative clamping movement of said support and member, means operated by said relative clamping movement to force the last support with its last and upper materials lengthwise in upper-conforming contact under pressure with the end embracing means at the end of the last and yieldingly to maintain the last support in such pressure applying position, and means to actuate the end embracing means to embrace the upper and last to conform the upper to the sides of the last at its end.

40. In a machine of the class described, the combination of a clamping band arranged to be closed to embrace and conform a boot or shoe upper to one end of a last, a last support and an opposed member connected for simultaneous movement toward each other to clamp a last between them and for movement from each other, mechanism for effecting relative last clamping movement of the support and member, means operated by said mechanism to force the last support with its last and upper materials lengthwise in upper conforming contact under pressure with the clamping band at the end of the last and yieldingly to maintain the last support in such pressure applying position, and means operative in time relation to close the clamping band to conform the upper materials to the sides of the last at said end of the last.

41. In a machine of the class described, means for clamping and supporting a last in operative position for lasting, including opposed members at the top and bottom of a last, respectively, arranged to clamp a last between them, and direct connections between said opposed members arranged to cause one of them to move whenever the other is moved to clamp the last.

42. In a machine of the class described, means for clamping and supporting a last in operative position for lasting, including opposed members at the top and bottom of a last, respectively, arranged to clamp a last between them, and operating connections between said members effective to cause the same to move invariably in opposite directions toward or from each other.

43. In a machine of the class described, means for clamping and supporting a last in operative position for lasting, including opposed members at the top and bottom of a last, respectively, arranged to clamp a last between them, means connected to one of said members to operate it, and direct connections between said members to cause the member which receives such operative movement to impart simultaneously to the other member movement in the opposite direction.

44. In a machine of the class described, means for clamping and supporting a last in operative position for lasting, including opposed members at the top and bottom of the last respectively, arranged to clamp a last between them, one of said members having last engaging means thereon arranged to yield relatively to the other member, means for operating one of said opposed members, and means directly connecting the operable member to the other of said opposed members for imparting movement to the other to cause said opposed members to move simultaneously toward or from each other upon actuation of the operating means.

45. In a machine of the class described, means for supporting and holding a last in position for lasting, including a last support and an opposed member between which the last is adapted to be clamped, said last support including a yieldable last engaging portion, operating connections between the last support and the opposed member effective to cause them to move invariably in opposite directions simultaneously, means for operating said member and support to move them in said opposite directions, and lasting means opposing movement of a last on said last support toward said opposed member when said lasting means is engaged with the marginal portion of a shoe upper over the bottom of the last.

46. In a machine of the class described, means for supporting and holding a last in lasting position, including an upwardly extending lower member to support the last from beneath, an upper member to engage the last from above, means for raising and lowering the lower member, and operating mechanism directly connecting said lower member with the upper member to cause the upper member to be moved by the lower

member, said lower member having last engaging means thereon constructed and arranged to yield downwardly when raised to permit the last to be lowered by the coincident downward movement of the upper member in engagement with the last.

47. In a machine of the class described, the combination of wiper plates, means for projecting said plates over the edge of a shoe sole on the bottom of a last, opposed members directly connected for coincident movement toward each other to clamp a last between them and to support the last in lasting position, one of said opposed members being arranged yieldingly to support the last, and means for moving the other of said opposed members in time relation to the movement of the wiper plates over the edge of the shoe sole and in a direction to permit the yielding pressure of the other of said members to be operative against said wiper plates.

48. In a machine of the class described, means for supporting and holding a last in position for lasting, including a member to support the last, a member to engage the last at its opposite side to clamp the last, means for raising and lowering one of said members, said last named member having thereon last engaging means constructed to yield relatively to the clamping member, and operating mechanism directly connecting said members to cause them to move invariably in opposite directions.

49. In a machine of the class described, means for supporting and holding a last in lasting position including a member to support the last from beneath and an upper member to engage the last from above, operating mechanism directly connecting said members to cause them to move simultaneously in opposite directions, one of said members being pivoted to permit a longitudinal movement of the last, and upper conforming means positioned to engage the end of the last.

50. In a machine of the class described, the combination of opposed members adapted to hold a last between them, operating means directly connecting said opposed members arranged simultaneously to move said members toward each other to clamp the last between them, means for effecting longitudinal movement of the last coincidently with movement of said members toward clamping relation to the last, and upper conforming means positioned to oppose such longitudinal movement of the last.

51. In a machine of the class described, the combination of opposed members arranged to hold a last between them, means for simultaneously moving said members toward each other to clamp the last between them, means for effecting a longitudinal movement of the last coincidently with movement of said members toward clamping relation to the last, upper conforming means opposing said longitudinal movement of the last, and means operable subsequently to actuate the upper conforming means to clamp and conform the upper materials to the sides of the last.

52. In a machine of the class described, the combination of opposed members constructed and arranged to clamp a last between them, means for moving said members toward each other to clamp the last between them, means operated by such clamping movement of the members coincidently to move the last longitudinally, upper conforming means positioned to oppose such longitudinal movement of the last, and means for automatically operating the conforming means to clamp and conform the upper to the last in time relation to the longitudinal movement of the last.

53. In a machine of the class described, the combination of upper conforming means to embrace a shoe upper on its last at one end of the last, means for clamping and holding a last in lasting position, means operative to move the last longitudinally toward said conforming means, and means operative subsequently and in time relation to cause the conforming means to embrace and conform the upper materials to the sides of the last at said end of the last.

54. In a machine of the class described, means for supporting and holding a last in lasting position, including opposed members relatively movable to clamp a last between them, means for moving one of said members, and means for moving and supporting the other member, including an arm extending laterally over and spaced from the sole on the last and having operating connections from the first mentioned member.

55. In a machine of the class described, in combination, means for supporting and holding a last in lasting position, including opposed members relatively movable to clamp a last between them, means for moving one of said opposed members, means for supporting and moving the other of said opposed members including a vertically movable member having operating connections from the first-mentioned member and an arm carried by the upper end of said vertically movable member and extended laterally over and spaced from the surface of the sole portion of the last.

56. In a machine of the class described, in combination, means for supporting and holding a last in lasting position, including opposed members relatively movable to clamp a last between them, means for moving one of said members, means for moving and supporting the other of said opposed members including vertically movable members located at the sides of the last, a sup-

porting arm for said other opposed member carried at the upper ends of said vertically movable members and extending laterally over and spaced from the surface of the sole portion of the last, and connections for transmitting motion to the said vertically movable members to cause simultaneous movement of the opposed members.

57. In a machine of the class described, in combination, heel lasting mechanism, means for supporting a last in lasting position, including an upwardly movable member having a spindle for supporting the heel end of the last, and means for moving said member upwardly and for simultaneously moving the spindle laterally toward the lasting mechanism, said spindle being bodily adjustable transversely of the upwardly movable member and in a direction lengthwise of the last properly to locate the heel end of the last relatively to the heel lasting mechanism.

58. In a machine of the class described, heel lasting mechanism, means for supporting a last in lasting position, including an upwardly movable last supporting member with a spindle pivotally mounted thereon and arranged to support the heel end of the last, said spindle being mounted for bodily adjustment transversely of the upwardly movable member and lengthwise of the last properly to locate the heel end of the last relatively to said lasting mechanism and being arranged to swing upon its pivot in a direction longitudinally of the last, and means operative in time relation to the upward movement of said supporting member to swing said spindle.

59. In a machine of the class described, the combination of end lasting mechanism, means for supporting a last in position for the lasting operation of said end lasting mechanism including a vertically movable member, power driven means for operating said member, a spindle carried by said member and arranged to support that end of the last to be operated upon, and means for adjusting said spindle into and out of vertical alinement with the longitudinal axis of said vertically movable member to locate said end of the last in appropriate relation to the end lasting mechanism.

60. In a machine of the class described, in combination, end lasting means, means for supporting a last in position for lasting a shoe upper thereon including a vertically movable rod, and an upwardly extending last spindle carried by and adjustable transversely of the rod into and out of vertical alinement with the longitudinal axis of the rod and in a direction longitudinally of the supported last properly to locate the end of the last relatively to said end lasting means.

61. In a machine of the class described, the combination of means adapted to conform a boot or shoe upper to a last at one end of the last, end wipers, and means to support a last in a position relative to said conforming means and end wipers for lasting a shoe upper on the last comprising a vertically movable standard, means for moving the standard vertically to lasting position, and an upwardly extending last supporting spindle mounted on said standard for bodily adjustment transversely of the standard and lengthwise of the last and for tilting movement to incline the last into a desired plane relative to the plane of the end wipers.

62. In a machine of the class described, means for supporting a last in lasting position, including a vertically movable rod with means for moving the rod vertically, an upwardly extending pivoted spindle, means for bodily adjusting said spindle in a direction transversely of the rod and lengthwise of the last, said spindle being adapted to turn upon its pivot, and means to adjust said spindle on its pivot in a direction longitudinally of the last supported by the spindle.

63. In a machine of the class described, means for supporting a last in lasting position including a vertically movable member, an upwardly extending pivoted spindle carried by said member, means bodily to adjust said spindle transversely of said member and in a direction lengthwise of a supported last, and means automatically operative to turn said spindle upon its pivot.

64. In a machine of the class described, means for supporting a last in lasting position including a vertically movable member and means for raising and lowering said member, a spindle pivotally attached to said member, and means operated by the raising and lowering means to turn the spindle upon its pivot.

65. In a machine of the class described, means to support a last in lasting position comprising a vertically movable member with means for raising and lowering said member, a spindle pivotally attached to said member, and means operative in time relation to the raising and lowering movements to turn said spindle upon its pivot.

66. In a machine of the class described, means to support a last in lasting position comprising a vertically movable member with means for raising and lowering said member, a spindle pivotally attached to the member, means operative in time relation to the raising and lowering movements to turn said spindle upon its pivot, and means yieldingly opposing turning movement of said spindle.

67. In a machine of the class described,

the combination of means for supporting a last in position for lasting the end of a shoe upper thereon, end wiping mechanism comprising a carrier and end lasting wipers mounted thereon for yielding movement in a direction substantially perpendicular to the plane of the last bottom, spring means arranged to oppose heavy yielding resistance to such movement of the wipers, and means for moving the carrier and wipers bodily lengthwise of a supported last in such relation to the plane of the last bottom as to cause the wipers to engage the upper on the sides of the last below the plane of a sole on the last bottom and for continuing said bodily movement to cause said wipers to be forced by the shoe materials to climb up over the edge of the tread face of the shoe sole against said heavy yielding resistance.

68. In a machine of the class described, the combination of means for supporting a last in position for lasting the end of a shoe upper thereon, means to embrace and conform the upper to the sides of the last at said end, end wiping mechanism comprising end embracing wipers and a carrier for the wipers bodily movable lengthwise of a supported last toward and from the end of the last and on which said wipers are mounted for yielding movement substantially perpendicularly to the plane of the last bottom, spring means arranged to oppose heavy yielding resistance to such movement of the wipers, and means for coincidently closing the wipers and bodily moving the carrier and wipers lengthwise of and toward the last in such relation to the plane of the last bottom as to cause the wipers to embrace the sides of the last end below the plane of a sole on the last bottom and for continuing said bodily movement to cause the wipers to be forced by the shoe materials to climb up over the edge of the tread face of the shoe sole against said yielding resistance.

69. In a machine of the class described, the combination of means for supporting a last in position for lasting the end of a shoe upper thereon, end wiping mechanism comprising end lasting wipers and a carrier for said wipers bodily movable lengthwise of and toward the end of a supported last, operating means for projecting said carrier and wipers bodily lengthwise of the shoe in such relation to the plane of the last bottom as to cause the wipers to engage the upper on the sides of the last below the plane of a sole on the last bottom, and connections between said operating means and carrier constructed and arranged to permit the wipers bodily to be forced by the shoe materials up over the edge of the tread face of the shoe sole against yielding resistance upon continued projecting movement of said operating means and carrier.

70. In a machine of the class described, in combination, a last and shoe support, an end embracing band, an end lasting wiper, a wiper carrier, and operating means for said carrier organized bodily to move the carrier and wiper lengthwise of a supported last in such a plane as to cause the wiper to engage the upper on the last below the plane of the shoe sole and organized to continue said bodily movement to cause said wiper to climb up to and advance over the margin of the tread face of said sole, said operating means having a connection with said carrier constructed and arranged to permit said carrier to move upwardly with the climbing wiper against relatively strong yielding resistance.

71. In a machine of the class described, the combination of a last and shoe support, an end embracing band arranged to engage the sides of a shoe upper below the plane of its sole, end embracing wipers, a wiper carrier, operating means for said carrier organized bodily to move the carrier and wipers lengthwise of and toward the end of a supported last with a component of movement substantially perpendicular to the plane of the last bottom to bring the wipers into contact with the upper below the plane of the shoe sole and to continue bodily lengthwise movement of the wipers, and means yieldingly opposing upward movement of the wipers over the edge of the shoe sole as said wipers continue to move lengthwise of the last.

72. In a machine of the class described, the combination of a last support, end wipers for wiping the upstanding marginal portion of a shoe upper on a supported last down over the edge of a shoe sole on the bottom of the last, means to project the wipers over the bottom of the last at one end and to retract the wipers, and means operative to cause downward pressure against the wipers and coincident upward pressure of the edges of the shoe upper against the wipers during projection of the wipers and operative to relieve pressure against the wipers during each retracting movement of the wipers.

73. In a machine of the class described, the combination of a last support, end wipers for wiping the marginal portion of a shoe upper on a supported last down over the edge of a shoe sole on the bottom of the last, mechanism automatically to project the end wipers a plurality of times over the bottom of the last at one end and to retract the wipers after each projection, and means constructed and arranged automatically to cause downward compacting pressure against the wipers and coincident

upward pressure of the edges of the shoe upper against the wipers in timed relation to and during each projection of the wipers and automatically to relieve pressure against the wipers during each retracting movement of the wipers.

74. In a machine of the class described, the combination of a last support, end wipers for wiping the marginal portion of a shoe upper on a supported last down over the edge of a shoe sole on the bottom of the last, means automatically to project the wipers a plurality of times over the bottom of the last at one end and to retract the wipers after each projection, and means operative to cause yielding downward pressure against the wipers and coincident yielding upward pressure of the edges of the shoe upper against the wipers during each projection of the wipers and operative in time relation to relieve pressure against the wipers during each retracting movement of the wipers.

75. In a machine of the class described, the combination of a last support, end wipers for wiping the upstanding marginal portion of a shoe upper on a supported last down over the edge of a shoe sole on the bottom of the last, mechanism operative automatically to project the wipers a plurality of times over the bottom of the last at one end and to retract the wipers after each projection, and means operative in time relation to cause downward pressure against the wipers and coincident upward pressure by the last support against the wipers during each projection of the wipers over the last bottom and operative in time relation to relieve the upward pressure of the last support during each retracting movement of the wipers.

76. In a machine of the class described, the combination of a last support, end wipers for wiping the upstanding marginal portion of a shoe upper on a supported last down over the edge of a shoe sole on the bottom of the last, mechanism operative automatically to project the wipers a plurality of times over the bottom of the last at one end and to retract the wipers after each projection, and means operative in time relation to cause downward yielding pressure against the wipers and coincident upward yielding pressure of the last support to press the upper yieldingly against the wipers during each projection of the wipers over the last bottom and operative in time relation to relieve the upward pressure of the last support during each retracting movement of the wipers.

77. In a machine of the class described, the combination of end wipers, last and shoe supporting means movable to position a last and shoe upper in coöperative relation to the wipers with the bottom of a sole on the last above the plane of the wipers, mechanism automatically operative to advance the wipers to engage the upper and relatively to move the wipers and last vertically to upwipe and conform the upper and subsequently to advance and retract the wipers over the shoe sole a plurality of times without backing the wipers off the sole between the first advance and last retraction of the wipers, and means operative to exert upper compacting pressure against the wipers perpendicularly to the plane of the sole during each advancing movement of the wipers and operative to relieve said pressure during each retracting movement of the wipers.

78. In a machine of the class described, the combination of end wipers, last and shoe supporting means movable to position a last and shoe upper in coöperative relation to the wipers with the bottom of a sole on the last above the plane of the wipers, mechanism automatically operative to advance the wipers to engage the upper and relatively to move the wipers and last vertically to upwipe and conform the upper and subsequently to advance and retract the wipers over the sole a plurality of times without backing the wipers off the sole between the first advance and last retraction of the wipers, and means operative to exert yielding downward compacting pressure on the wipers, and yielding upward compacting pressure of the edges of the shoe upper against the wipers during each advancing movement of the wipers and operative to relieve the compacting pressure during each retracting movement of the wipers.

79. In a machine of the class described, the combination of end wipers, last and shoe supporting means movable to position a last and shoe upper in coöperative relation to the wipers with the bottom of a sole on the last above the plane of the active face of the wipers, mechanism automatically operative to advance the wipers to engage the upper and relatively to move the wipers and last vertically to upwipe and conform the upper and subsequently to advance and retract the wipers over the sole a plurality of times without backing the wipers off the sole between the first advance and last retraction of the wipers, an end clamping member constructed and operative in time relation to embrace and conform the shoe upper at the end of the last to the side of the last adjacent to the bottom of the last during the period of the plurality of wiping projections, and means operative to exert upper compacting pressure against the wipers perpendicularly to the plane of the sole during each advancing movement of the wipers and operative to relieve said pressure during each retracting movement of the wipers.

80. In a machine of the class described,

the combination of end-embracing wipers, last supporting means movable to position a supported last with its shoe upper in co-operative relation to the wipers and with the sole on the last bottom above the plane of the active face of the wipers, and means organized bodily to advance the wipers lengthwise of the last into contact with the shoe upper below the plane of the shoe sole and to continue said advance to cause said wipers to climb up the side over the last to the plane of the sole and to advance over the margin of the sole with downward compacting pressure, said means including a wiper carrier constructed to yield upwardly with the wipers through pressure of the edge of the upper and sole against the edge face of the wipers as the carrier and wipers continue to advance.

81. In a machine of the class described, the combination of end-embracing wipers, last supporting means movable to position a supported last with its shoe upper in coöperative relation to the wipers and with the sole on the last bottom above the plane of the active face of the wipers, and mechanism automatically operative to advance the wipers into contact with the side of the shoe upper below the plane of the shoe sole and to continue to advance the wipers after they have engaged the shoe, said mechanism including wiper-carrying means mounted for bodily forward movement with the wipers to advance the wipers and constructed to yield upwardly with the wipers against spring pressure in response to pressure of the upper and sole against the edge face of the wipers as they continue their advance to tension the wipers downwardly against the edge of the upper and sole.

82. In a machine of the class described, the combination of pivoted end wipers, last supporting means movable to position a supported last with its shoe upper in coöperative relation to the wipers and with the sole on the bottom of the last above the plane of the active face of the wipers, and power operated mechanism automatically operative to close the wipers against the side of the upper below the plane of the sole and to cause the wipers to climb up over the edge of the sole and in time relation bodily to reciprocate the wipers over the sole and coincidently to swing the wipers inwardly and outwardly, said mechanism including wiper-carrying means mounted for bodily forward movement and arranged for upwardly yielding movement with the wipers in response to pressure of the upper and sole against the edge face of the wipers and having yielding connections in the wiper reciprocating and swinging means.

83. In a machine of the class described, the combination of a movable wiper head, carrying members mounted for rotative movement upon said head, wiper plates carried by and movable with said members and having formed wiping edges to embrace the end of a shoe upon a last, racks and pinions to impart rotative movement to said carrying members, said racks being yieldingly held against longitudinal movement, and means for reciprocating the wiper head bodily to move the wiper plates forwardly and backwardly and to impart opening and closing movements to the plates through said racks.

84. A machine of the class described, having in combination, a movable wiper head carrying members mounted for rotative movement upon said head, wiper plates having formed wiping edges to embrace the end of a shoe upon a last, racks and pinions to impart rotative movement to said carrying members, said racks being yieldingly and adjustably held against longitudinal movement relatively to the wiper head, and means for reciprocating the head bodily to move the wiper plates forwardly and backwardly and to impart opening and closing movements to the wiper plates through said racks.

85. A machine of the class described, having in combination, a movable wiper head, a stationary support for said head, carrying members mounted upon said head for swinging movement thereon, end embracing wiper plates mounted on said carrying members to turn therewith, a rack and pinion for operating each carrying member, said racks being adjustably connected to said stationary support with means to permit said racks to move lengthwise with said wiper head when substantial resistance is offered to the closing of said wiper plates as the head is moved forwardly, and means for moving said head toward and from the end of a last.

86. In a machine of the class described, in combination, a flexible last and shoe upper embracing member, and means for supporting and operating said embracing member including a series of pressure members extending longitudinally of the flexible member, a common carrier for said pressure members, means for bodily moving said carrier toward the side of an embraced last, and means independently to adjust the pressure members toward and from the last to conform the flexible member to the side of the last and shoe lengthwise of the last.

87. In a machine of the class described, the combination of a last and shoe support, a flexible last and shoe upper embracing member, and means for supporting and operating said member including a carrier member, means arranged to move said carrier member toward a last to force the flexible member into last conforming contact with an upper at the side of the last, and a series of pressure members positioned upon

the carrier member and adjustable relatively to the carrier member toward and from the last.

88. In a machine of the class described, the combination with a flexible member for embracing the sides of a shoe upper at the end of its last, carrier members to which the flexible member is connected for closing said member upon the upper at the end of the last, and a series of pressure members supported by each carrier member and attached to the flexible member, the pressure members of each series being independently adjustable relatively to their carrier member to adjust the flexible member independently of the movements of said carrier members.

89. An end lasting mechanism having, in combination, a last support, a heel embracing band independently of movement of the last support, means for closing the band, a pressure member at each end of the band formed to apply pressure to the upper and lower parts of the band and mounted to turn about a horizontal pivot and screws adjustable to vary the pressure applied through said members.

90. An end lasting mechanism having, in combination, means to support a last and shoe upper in position for lasting one end thereof, coöperating pivoted end wiper plates arranged to wipe a shoe upper over the end of its last, and means for closing said plates over the bottom of a supported last including independently closing connections for said plates constructed and arranged to permit simultaneous swinging movement of said plates in the same direction about the end of a last automatically to adjust said wipers relatively to the median line of said end of the last.

91. An end lasting mechanism having, in combination, means to support a last with a shoe upper thereon in position for lasting one end thereof, pivoted end wipers, and power operated means for closing said wipers over the bottom of a supported last including independent connections constructed and arranged to permit said wipers automatically to swing about the end of the supported last simultaneously and in the same direction to adjust the wipers relatively to the median line of said end.

92. An end lasting mechanism having, in combination, means to support a last with a shoe upper thereon in position for lasting one end thereof, pivoted end wipers, and means to close said wipers over the end of a supported last including independent yielding operating connections to said wipers arranged to permit swinging of said wipers simultaneously about the end of the last in the same direction to adjust them relatively to the median line of said end of the last, responsively to greater resistance offered to closing over of the wipers at one side of the last than at the other.

93. An end lasting mechanism, having, in combination, means to support a last and shoe upper in position for lasting an end thereof, pivoted end wipers, carriers for said wipers, and means to operate said carriers to close said wipers over the end of a supported last, said means including independent operating connections to each of said carriers constructed and arranged to permit pressure against a wiper carrier at one side of an improperly positioned last end aufomatically to swing said carrier about said last end in the same direction as the other carrier to adjust the wipers relatively to the median line of said end.

94. An end lasting mechanism having, in combination, means to support a last and shoe upper in position for lasting one end thereof, pivoted end wipers, carriers for said wipers mounted for swinging movement to close and open said wipers, and means to operate said carriers to close said wipers over the bottom of the last, said operating means including independent yielding wiper closing connections for each carrier arranged to permit unequal pressures against the closing wipers at the sides of an improperly positioned last automatically to swing the carrier at one side of the last rearwardly end in the same direction as the closing carrier at the opposite side of the last to adjust their wipers relatively to the median line of said end of the last.

95. In a heel seat lasting machine, the combination with seat lasting wipers, of work supporting means comprising a vertical slide, operating means connected with the slide for moving it up and down, a work supporting rod movable endwise in the slide, and a stiff spring resting at its lower end against the slide and at its upper end engaging a collar on the work supporting rod.

96. In a heel seat lasting machine, the combination with seat lasting wipers, of work supporting means comprising a vertical slide, operating means connected with the slide for moving it up and down, a work supporting rod movable endwise in the slide, a stiff spring resting at its lower end against the slide and at its upper end engaging a collar on the work supporting rod, and operating means for the wipers and said slide organized to move said parts in time relation.

97. In a heel seat lasting machine, the combination with heel seat lasting wipers, of shoe supporting means comprising a rod guided for vertical movement toward and from the wipers in approximately the vertical axis of the last hole, power driven means for operating said wipers and rod, and a last spindle mounted on said rod for

right line adjustment thereon longitudinally of the last to position the heel end of a last in proper relation to the heel wipers.

98. In a heel seat lasting machine, the combination with heel seat lasting wipers, of shoe supporting means comprising a rod guided for vertical movement toward and from the wipers in approximately the vertical axis of the last hole, and a last spindle mounted on said rod for right line adjustment thereon longitudinally of the last to position the heel end of a last in proper relation to the heel wipers, said last spindle comprising a supporting member and a last pin mounted thereon to yield against the pressure of the last.

99. In a heel seat lasting machine, the combination with heel seat lasting wipers, of last supporting means comprising a rod guided for vertical movement in a fixed path, and a last spindle mounted on the head of the rod and having a forwardly and backwardly tipping and downwardly yielding last pin, combined with means for adjusting the spindle forwardly and backwardly on the rod to shift the last pin pivot forwardly or backwardly with relation to the line of vertical pressure exerted on the heel seat by the heel seat wipers.

100. In a heel seat lasting machine, the combination with seat lasting wipers, of shoe supporting means movable to apply pressure between the last and the wipers, said supporting means including a pivotally mounted last pin, and adjusting means for causing the last pin to tip backwardly in response to such pressure.

101. In a heel seat lasting machine, the combination with seat lasting wipers and a heel embracing band, of work supporting means including a vertically movable rod, a last pin mounted on the rod for forward and backward tipping movement, and means for adjusting the last pin forwardly and backwardly with relation to the rod to locate the pivotal support for the last pin so that the pin will automatically tip backwardly in the holes of lasts of different sizes or having differently located pin holes in response to vertical pressure of the last against the wipers.

102. In a heel seat lasting machine, the combination with seat lasting wipers and a heel embracing band, of vertically movable work supporting means including a last pin pivoted to swing forwardly and backwardly, a device for holding the last pin against forward swinging movement, and means operative automatically to disengage said device when the work support is depressed and to engage the device and cause it to hold the last pin against forward movement when the work support is upraised.

103. In a heel seat lasting machine, the combination with seat lasting wipers and a heel embracing band, of vertically movable work supporting means including a last pin mounted to tip forwardly and backwardly, means for elevating and depressing the work support, and means operating automatically to tip the last pin backwardly and force the last into the heel band when the support is elevated and to free the last pin for forward tipping movement when the work support is depressed to facilitate the removal and application of the work.

104. In a heel seat lasting machine, the combination with seat lasting wipers and a heel embracing band, of vertically movable work supporting means including a last pin pivoted to swing forwardly and backwardly, said pin having a ratchet arm rigid with its pivot, backwardly faced ratchet teeth on said arm, a pawl yieldingly pressed toward said ratchet teeth to hold the last pin in its backwardly tipped position, and means for automatically disengaging the pawl and holding it out of engagement with the ratchet teeth when the work support occupies its depressed position.

105. In a heel seat lasting machine, the combination with seat lasting wipers and a heel embracing band, of vertically movable work supporting means including a last pin pivoted to swing forwardly and backwardly, a ratchet arm rigid with the last pin pivot, a swinging pawl carrier on the last pin pivot, a pawl on the carrier, and operating means organized to depress the work support for removal and application of the work and simultaneously to disengage the pawl from the ratchet to permit the last pin to be tipped forwardly and thereafter to elevate the work support and free the pawl to engage the ratchet for holding the last pin in the backwardly tipped position to which the workman moves it, and subsequently to swing the pawl carrier in the direction for forcibly tipping the last pin farther backwardly and thrusting the last into the heel band.

106. In a heel seat lasting machine, the combination with seat lasting wipers and a heel embracing band, of vertically movable work supporting means including a last pin pivoted to swing forwardly and backwardly, and operating means permitting the last pin to be tipped forwardly and backwardly for application and removal of the shoe and organized to effect an upward movement of the work support preparatory to the seat lasting operation and a forcible backward tipping of the last pin for pressing the last hard back into the heel band.

107. In a heel seat lasting machine, the combination with seat lasting wipers, the plane of operation of which is predetermined within limits, of a hold down arranged to engage the heel seat of the shoe, a last pin, and operating mechanism yieldingly connected with the last pin and ar-

yieldingly connected with the hold down and organized to move the hold down and the last pin each toward the other from shoe receiving positions and present the heel seat faces of different sized shoes in predetermined relation to the plane of operation of the wipers.

108. In a heel seat lasting machine, the combination with seat lasting wipers, of a hold down, a last pin, single slide yieldingly connected to the last pin for elevating the last pin and unyieldingly connected to the hold down and means for imparting a predetermined movement to the slide for causing the hold down to determine the plane of the heel seat invariably while the last pin yieldingly clamps the shoe against the hold down.

109. In a heel seat lasting machine, the combination with seat lasting wipers, of a vertically movable last pin, a slide in which the last pin is yieldingly mounted, bars mounted for vertical sliding movement at opposite sides of the machine and connected at their upper ends by a cross head, a hold down mounted on the cross head to engage the shoe substantially over the last pin, lever connections between the slide and the bars arranged to force the hold down downwardly simultaneously with the elevation of the last pin, and means for imparting a predetermined movement to the slide in time relation to the operative movement of the seat lasting wipers.

110. In a heel seat lasting machine, the combination with seat lasting wipers, of shoe positioning mechanism comprising a last pin and a hold down, and operating mechanism for advancing and retracting the wipers and for causing the shoe positioning mechanism to clamp the work and to impart to the work predetermined down and up movements with relation to the wipers in time relation to the closing and opening movements of the wipers with the plane of the heel seat presented initially above the plane of the wipers.

111. In a heel seat lasting machine, the combination with seat lasting wipers, of shoe positioning mechanism comprising a last pin and a hold down, and operating mechanism for closing and opening the wipers and for causing the shoe positioning mechanism to clamp the shoe and hold it with the plane of the heel seat in a predetermined relation to the plane of the wipers during an initial portion of the movement of the wipers over the heel seat and then while the wipers are positioned over the heel seat to elevate the plane of the heel seat for the operation of the wipers during a subsequent portion of their movement.

112. In a heel seat lasting machine, the combination with seat lasting wipers of shoe positioning mechanism including an unyielding hold down and a yielding last pin, and operating mechanism for reciprocating the wipers and for relatively moving the hold down and last pin to clamp the work and present it with the plane of the heel seat in a predetermined position during an initial portion of the movement of the wipers over the heel seat and then to raise the hold down and increase the upward pressure of the shoe against the wipers during the completion of the advance of the wipers over the heel seat.

113. In a heel seat lasting machine, the combination with seat lasting wipers, of shoe positioning mechanism comprising a single vertically movable power operated slide, a last pin yieldingly connected with the slide, a hold down, and connections between the slide and the hold down by which the hold down is forced downwardly as the slide and last pin are elevated.

114. In a heel seat lasting machine, the combination with seat lasting wipers, of embracing means comprising a bracket and arms pivotally connected together and to the bracket at the rear end of the heel seat and having pressure members formed thereon to press upon the work at opposite corners of the heel for clamping the upper materials against the last at the corners of the heel, and means for swinging said arms about their pivots to effect clamping of the work.

115. In a heel seat lasting machine, the combination with seat lasting wipers, of embracing means comprising a bracket and arms pivotally connected together and to the bracket and each carrying a plurality of relatively yielding pressure members arranged to press upon the work at the sides of the heel for clamping the upper materials to the side faces of the last, and means for swinging the arms about their pivot to effect the clamping of the work in time relation with the operation of the seat lasting wipers.

116. In a heel seat lasting machine, the combination with seat lasting wipers, of embracing means comprising a bracket and arms pivotally connected together and to the bracket and each carrying a plurality of relatively yielding pressure members arranged to press upon the work at the sides of the heel for clamping the upper materials to the side faces of the last, and independently yielding means for engaging the respective arms and swinging them about their pivots for effecting clamping pressure of the pressure members against the opposite sides of the heel.

117. In a heel seat lasting machine, the combination with seat lasting wipers, of embracing means comprising a bracket and arms pivotally connected together and to the bracket and each carrying a plurality of rel-

atively yielding pressure members arranged to press upon the work at the sides of the heel for clamping the upper materials to the side faces of the last, and power operated means for swinging the arms about their pivot and imparting to said pressure members combined inward and forward movement, said members being free to yield outwardly in the arms but compelled to move forwardly with the arms whereby to effect a forward tension of the engaged upper materials as the arms close and the pressure members yield outwardly in the arms.

118. In a heel seat lasting machine, the combination with seat lasting wipers, of means for clamping the upper materials against the side faces of the heel portion of the last, including a pressure applying member mounted to turn about a horizontal pivot and yieldingly held in position to apply clamping pressure first adjacent to the heel seat face of the shoe and then to turn and spread the area of clamping pressure downwardly along the side of the last.

119. In a heel seat lasting machine, the combination with seat lasting wipers, of a heel embracing band, swinging carriers to which the front end portions of the band are connected, and means yieldingly connecting the rear middle portion of the band with its carriers and allowing said middle rear portion of the band to spring away from its carriers as the band is opened.

120. In a power heel seat lasting machine, the combination with means for supporting a shoe in position to be operated upon, of seat lasting wipers, a wiper carrying head bodily movable lengthwise of the last, a cam, a lever, a link extending from the lever through a portion of the head, and a spring interposed between the head and a portion of the link for yieldingly transmitting the cam motion to the wiper carrying head.

121. In a power heel seat lasting machine, the combination with means for supporting a shoe in position to be operated upon, of seat lasting wipers, a wiper carrying head bodily movable lengthwise of the last, a cam, a lever, a link, a pivot pin connecting the lever and link and having a pin and slot connection with the wiper carrying head, and a spring arranged between the wiper carrying head and a portion of the link to transmit the cam motion yieldingly to the wiper carrying head and allow compression as the wiper encounters resistance and the pivot pin moves in its slot connection with the head.

122. In a power heel seat lasting machine, the combination with means for supporting a shoe in position to be operated upon, of seat lasting wipers, a wiper carrying head arranged for bodily movement forwardly and backwardly, a cam, a lever extending from the cam and having a pivotal connection with the rear end of the wiper carrying head, a link connection between the forward portion of the wiper carrying head and a fixed portion of the machine, and a spring associated with said link connection to permit the wiper carrying head to move vertically for allowing the wipers to climb over the edge of the shoe as they are advanced.

123. In a power heel seat lasting machine, the combination with end embracing wipers and means for supporting a shoe in position to be operated on, of means operating in time relation to clamp the shoe and to advance the wipers lengthwise of the shoe to engage the shoe below the plane of its sole, said wipers being mounted with capacity for limited upward movement against yielding resistance to climb up to the plane of the sole as they continue said advancing movement after thus engaging the shoe.

124. In a power heel seat lasting machine, the combination with end embracing wipers, of shoe supporting means, and power operating mechanism organized to position the shoe automatically with the plane of the heel seat elevated to a predetermined extent above the plane of the lower face of the wipers and to advance the wipers to embrace the heel below the plane of the heel seat and by continued advancing movement to climb upwardly against yielding reisistance over the edge of and on to the heel seat and gather the upper inwardly over the heel seat.

125. In a power heel seat lasting machine, the combination with end embracing wipers, of shoe supporting means, and power operating mechanism organized to position the shoe automatically with the plane of the heel seat elevated to a predetermined extent above the plane of the lower face of the wipers and to advance the wipers lengthwise of the shoe to cause them to embrace the heel slightly below the plane of the heel seat and to continue said lengthwise advance of the wipers to cause them to climb up over the edge of the heel seat against yielding resistance frictionally pulling the upper to form it to the edge of the heel seat and press it upon the margin of the heel seat.

126. In a power heel seat lasting machine, the combination with heel embracing wipers, of an unyielding hold down and a yielding last pin for positioning a shoe with the plane of its heel seat slightly above the plane of the lower face of the wipers, wiper controlling means permitting a limited vertical displacement of the wipers against yielding resistance, means for advancing the wipers and causing them to climb over the edge of the heel seat, and means for raising the hold down to allow the yielding last pin to raise the shoe and take up the vertical yield of the wipers, whereby the completion of the advance of the wipers is effected with

the wipers held rigidly against upward displacement.

127. In a power heel seat lasting machine, the combination with heel embracing wipers, and shoe positioning means, of controlling and operating mechanism for said wipers and positioning means organized to cause relative lengthwise movement of the shoe and the wipers, to cause the wipers to embrace the shoe slightly below the plane of the heel seat and to continue said relative lengthwise movement to cause the wipers to climb up over the edge of the heel seat against yielding resistance and then to advance to complete the wiping action with a vertically unyielding wiping movement.

128. In a power heel seat lasting machine, the combination with seat lasting wipers and means for supporting a shoe in position to be operated upon by said wipers, of controlling and operating mechanism for said wipers organized yieldingly to move the wipers bodily lengthwise of the shoe and to close them against the upper below the plane of the heel seat and to continue said lengthwise advance to cause them to climb up and advance inwardly over the heel seat, said mechanism including means arranged to permit said wipers to yield upwardly in response to advancing pressure of the wipers against the upper and last to permit the wipers to climb up over the edge of the heel seat as they are moved lengthwise of the shoe.

129. In a power heel seat lasting machine, the combination with seat lasting wipers and means for supporting a shoe in position to be operated upon by said wipers, of wiper-carrying means bodily movable toward and lengthwise of the last, and controlling and operating mechanism for said wipers and carrying means organized yieldingly to move said carrying means lengthwise of the shoe, first, to engage the wipers with the upper below the plane of the heel seat and then, by continued lengthwise movement, to cause the wipers to climb up over the edge of the heel seat and to advance inwardly, said mechanism including means to permit yielding upward movement of the carrying means responsive to advancing pressure of the wipers against the upper to permit the wipers to climb up over the edge of the heel seat.

130. In a machine of the class described, the combination with a shoe end embracing band, of means for applying pressure to said band to force it against a shoe, said pressure applying means being mounted to swing in response to resistance of the shoe about an axis extending in substantially parallel relation to the plane of the shoe bottom to permit the band to conform to the contour of the shoe, and spring means for determining a normal position of said pressure applying means with respect to movement about said axis.

131. In a machine of the class described, the combination with a shoe end embracing band, of members arranged to apply pressure to said band at opposite sides of a shoe to force the band against the shoe, said members being mounted to swing in response to resistance of the shoe about axes extending lengthwise of the shoe to permit the band to conform to the contour of the shoe, and spring means for determining a normal position of said members with respect to movement about said axes.

132. In a machine of the class described, the combination with a shoe end embracing band, of members for applying pressure to said band at opposite sides of a shoe, said members being mounted to swing in response to resistance of the shoe about axes extending lengthwise of the shoe, and spring means for positioning said members in such relation to the shoe as to cause the band to apply its pressure initially adjacent to the plane of the shoe bottom while permitting the band to be closed inward subsequently against other portions of the lateral surface of the shoe.

133. In a machine of the class described, the combination with a shoe end embracing band, of yielding means tending to position said band for engagement with the lateral periphery of a shoe initially adjacent to the edge of the shoe bottom while permitting the band subsequently to be forced inward into conforming relation to other portions of the lateral periphery of the shoe.

134. In a machine of the class described, shoe clamping means arranged to press upon the lateral periphery of a shoe and comprising a member mounted to tip in response to resistance of the shoe about an axis extending in substantially parallel relation to the plane of the shoe bottom to conform to the heightwise contour of the shoe, spring means arranged to oppose yielding resistance to tipping movement of said member, and an adjustable stop cooperating with said spring means to determine different normal positions of the member.

135. In a machine of the class described, shoe clamping means arranged to press upon the lateral periphery of a shoe and comprising a flexible end embracing band, a band supporting member mounted to tip vertically of the shoe and also to yield bodily relatively to the shoe, and spring means tending to resist said tipping and bodily yielding movements of the member.

136. In a machine of the class described, shoe clamping means comprising a flexible end embracing band, a band supporting member for supplying pressure on the lateral periphery of a shoe, said member being mounted to yield bodily in a direction trans-

verse to the surface on which said pressure is applied and also to swing about an axis extending longitudinally of said surface, and spring means, tending to resist said bodily yielding and swinging movements of the member.

137. In a machine of the class described, the combination with a shoe end embracing band, of pressure applying means movable laterally of the shoe to press said band inwardly against the shoe from the front end of the band rearwardly, and means movable lengthwise of the shoe in wedging engagement with said pressure applying means for applying said pressure.

138. In a machine of the class described, shoe clamping means comprising members mounted for movement laterally of a shoe and having wedge surfaces inclined to the lengthwise dimension of the shoe and directed outwardly and forwardly at the respective sides of the shoe, and means movable lengthwise of the shoe in engagement with said surfaces to force said members inwardly toward the shoe.

139. In a machine of the class described, shoe clamping means comprising members each mounted to swing laterally of the shoe about an axis at the end of the shoe and having a wedge surface inclined to the lengthwise dimension of the shoe, and means movable lengthwise of the shoe in engagement with said wedge surfaces for swinging said members inwardly toward the shoe.

140. In a machine of the class described, shoe clamping means comprising members mounted for movement laterally of a shoe into clamping relation to the shoe, thrust members movable lengthwise of the shoe for operating said clamping members, and mechanism comprising independently adjustable spring connections to the respective thrust members for operating said members.

141. In a machine of the class described, shoe clamping means comprising members mounted for movement laterally of a shoe into clamping relation to the shoe, thrust members movable lengthwise of the shoe for operating said clamping members, and a cross bar connected to said thrust members for operating them, the connections between said cross bar and thrust members comprising springs separately adjustable for varying the relative clamping pressures at the opposite sides of the shoe.

142. In a machine of the class described, the combination with end lasting means, of shoe positioning means movable in a direction transverse to the plane of the shoe bottom to position the shoe for the lasting operation, said shoe positioning means being movable also in a direction lengthwise of the shoe, and mechanism controlled by said first named movement of the positioning means for holding said means against movement in a direction lengthwise of the shoe.

143. In a machine of the class described, the combination with end lasting means, of shoe positioning means movable in a direction transverse to the plane of the shoe bottom to position the shoe for the lasting operation, said shoe positioning means including a last supporting spindle mounted to tip in a direction lengthwise of the shoe, and mechanism controlled by the movement of said shoe positioning means for holding said spindle against tipping movement.

144. In a machine of the class described, the combination with heel seat lasting means, of a heel end abutment, shoe positioning means movable in a direction transverse to the plane of the shoe bottom to position the shoe relatively to the lasting means, said shoe positioning means being movable also backwardly to thrust the heel end of the shoe against said abutment, and mechanism controlled by said first named movement of the shoe positioning means for holding said means against forward movement.

145. In a machine of the class described, the combination with end lasting means, of shoe positioning means, mechanism for moving said shoe positioning means in a direction transverse to the plane of the shoe bottom to position the shoe for the lasting operation, mechanism for imparting to said shoe also a lengthwise positioning movement comprising parts normally disconnected from each other, and means controlled by said first named movement of the shoe positioning means for connecting said parts to render said mechanism operative.

146. In a machine of the class described, the combination with end lasting means, of shoe positioning means, mechanism for moving said shoe positioning means in a direction transverse to the plane of the shoe bottom to position the shoe relatively to the lasting means, said shoe positioning means including a last supporting spindle mounted for tipping movement in directions lengthwise of the shoe, and pawl and ratchet mechanism connected to said spindle for tipping it in time relation to said first named movement of the shoe positioning means.

147. In a machine of the class described, the combination with end lasting means, of shoe positioning means, mechanism for moving said shoe positioning means in a direction transverse to the plane of the shoe bottom to position the shoe relatively to the lasting means, said shoe positioning means including a last supporting spindle mounted for tipping movement in directions lengthwise of the shoe, and mechanism controlled by said first named movement of the shoe positioning means for tipping said spindle

in one direction and for holding it against reverse tipping movement.

148. In a machine of the class described, the combination with heel seat lasting means, of a heel end abutment, shoe positioning means comprising a shoe support mounted to tip in directions lengthwise of the shoe, and power operated means comprising a ratchet and a pawl mounted to swing about the axis of said support for tipping the shoe against said abutment.

149. In a machine of the class described, the combination with end lasting means, of a shoe end abutment, and shoe positioning means comprising a shoe support mounted to tip in a direction lengthwise of the shoe to position the end of the shoe against said abutment, and normally free for tipping movement in response to pressure of the operator's hand upon the shoe, said shoe support being adjustable bodily in directions lengthwise of the shoe to determine the extent of tipping movement of the shoe and the consequent angular relation of the plane of the shoe bottom to the lasting means.

150. In a machine of the class described, the combination with shoe positioning means, of a member for laying the margin of the upper inwardly over the shoe bottom, operating means mounted for movement inwardly toward the edge of the shoe bottom to force said member over the shoe bottom, means constructed and arranged to permit a relative yield between said member and operating means in the direction of said inward movement, said member being mounted also for movement in a direction transverse to the plane of the shoe bottom in response to resistance of the shoe materials, and independent yielding means for controlling said last named movement of the member.

151. In a machine of the class described, the combination with shoe positioning means, of a wiper for laying the margin of the upper inwardly over the shoe bottom, operating means connected to said wiper and mounted for movement toward the lateral periphery of the shoe to force the wiper inwardly, the connection between said operating means and the wiper comprising a spring arranged to transmit movement to the wiper and to yield in response to resistance to inward movement of the wiper, said wiper being mounted also for movement in a direction transverse to the plane of the shoe bottom in response to resistance of the shoe materials, and a second spring for controlling said last named movement of the wiper.

152. In a machine of the class described, the combination with shoe positioning means, of a wiper mounted for movement inwardly over the margin of the shoe bottom and also for movement upwardly from said margin, wiper operating means mounted for movement toward the lateral periphery of the shoe, and independent yielding means between said wiper and operating means for controlling said different movements of the wiper.

153. In a machine of the class described, the combination with shoe positioning means, of a wiper mounted for movement inwardly over the shoe bottom and also to tip in directions transverse to the plane of the shoe bottom, wiper operating means mounted for movement toward the edge of the shoe bottom, spring means between said operating means and the wiper and through which said inward movement is imparted to the wiper, and other spring means tending to tip the wiper in a direction to press the shoe materials upon the margin of the shoe bottom while permitting the wiper to yield in response to resistance of said materials.

154. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers mounted for movement lengthwise of the shoe and also for yielding movement in a direction transverse to the plane of the shoe bottom, spring means through which said lengthwise movement is imparted to the wipers yieldingly, and other spring means for controlling said transverse yield of the wipers.

155. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, operating means for moving said wipers lengthwise of the shoe, said wipers being mounted on said operating means to swing bodily and relatively to said means in a direction transverse to the plane of the shoe bottom about an axis located beyond the end of the shoe, and means tending to swing the wipers in a direction to cause them to press the upper materials upon the shoe bottom, while permitting them to yield in response to resistance of said materials.

156. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, operating means for moving said wipers lengthwise of the shoe, said wipers being pivotally connected to said operating means to swing bodily about an axis extending laterally of the shoe beyond the end of the shoe and extending also in substantially parallel relation to the plane of the shoe bottom, and spring means tending to swing said wipers in a direction to cause them to press the upper materials upon the shoe bottom, while permitting them to yield in response to resistance of said materials.

157. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, and operating means comprising substantially par-

allel arms arranged to move said wipers lengthwise of the shoe while tending to maintain them in substantially uniform angular relation to the plane of the shoe bottom, said wipers being mounted to yield bodily away from the plane of the shoe bottom in response to resistance of the shoe materials during their operative movement.

158. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, operating means comprising substantially parallel arms arranged to move said wipers lengthwise of the shoe while tending to maintain them in substantially uniform angular relation to the plane of the shoe bottom, said wipers being pivotally mounted to permit them to swing bodily in response to resistance of the shoe materials during their operative movement about an axis located beyond the end of the shoe and extending in substantially parallel relation to the plane of the shoe bottom, and spring means tending to resist said swinging movement of the wipers.

159. In a machine of the class described, the combination with shoe positioning means, of upper shaping mechanism comprising end embracing wipers having wiping edges curved in substantial conformity to the lengthwise contour of the edge of the shoe bottom, means for effecting relative movement of said shoe positioning means and wipers in a direction lengthwise of the shoe in such relation as to cause the wipers to engage the shoe initially on its lateral periphery outside of the plane of the shoe bottom and subsequently to wipe the upper inwardly over the shoe bottom, said shoe positioning means and upper shaping mechanism being constructed and arranged to permit a relative yield between the shoe and the wipers in a direction transverse to the plane of the shoe bottom in response to wedging action of the shoe against the wipers to cause the wipers to wipe the upper over the edge of the shoe bottom prior to their wiping action over the shoe bottom.

160. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers having wiping edges curved in substantial conformity to the lengthwise contour of the edge of the shoe bottom, spring means against which said wipers are yieldable in a direction transverse to the plane of the shoe bottom, and means for closing said wipers against the lateral periphery of the shoe and by relative movement of the shoe and the wipers causing them to be forced by wedging action of the shoe over the edge of the shoe bottom against resistance of said spring means prior to their continued inward closing movement.

161. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers having wiping edges curved in substantial conformity to the lengthwise contour of the edge of the shoe bottom, spring means against which said wipers may yield in a direction transverse to the plane of the shoe bottom, and operating means for moving said wipers yieldingly to force them against the lateral periphery of the shoe at the end and along the opposite sides of the end portion of the shoe and for increasing the operating pressure to cause the wipers to be wedged by the shoe toward the plane of the shoe bottom against the resistance of said spring means while continuing in close embracing relation to the shoe.

162. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support movable to carry the wipers lengthwise of the shoe, and means arranged to be operated by said movement of the wiper support for closing the wipers inward laterally of the shoe during their movement lengthwise of the shoe, said closing means being yieldable in response to resistance encountered by the wipers to permit the wipers to continue their movement lengthwise of the shoe without closing.

163. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support movable to carry the wipers lengthwise of the shoe, and independent connections to the respective wipers arranged to be operated by said movement of the wiper support for closing the wipers inward laterally of the shoe, said connections being independently yieldable in response to the resistance encountered by the wipers.

164. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support movable to carry the wipers lengthwise of the shoe, means operated by said movement of the wiper support for closing the wipers inward laterally of the shoe comprising parts movable with said support and cooperating parts normally held against movement with the support as the wipers are closed, and yielding means for controlling said last named parts to permit them to move with the wiper support in response to abnormal resistance encountered by the wipers.

165. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support movable to carry the wipers lengthwise of the shoe, means for closing the wipers inward laterally of the shoe comprising pinions carried by said wiper support and racks engaging said pinions and normally held against movement with said sup-

port as the wipers are closed, and spring means arranged to permit said racks to move with the wiper support in response to predetermined resistance to closing movement of said wipers.

166. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, and mechanisms operative each independently of the other through relative movement of the shoe and the wipers lengthwise of the shoe for closing the respective wipers inward laterally of the shoe, said mechanisms being adjustable each independently of the other to determine the initial positions of the wipers.

167. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support mounted for movement lengthwise of the shoe, and independent wiper closing connections arranged to be operated by said movement of the support for closing the respective wipers inward laterally of the shoe, said connections being adjustable each independently of the other to determine the initial positions of said wipers.

168. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support movable to carry the wipers lengthwise of the shoe, and means operated by said movement of the wiper support for closing the wipers inward laterally of the shoe during their movement lengthwise of the shoe comprising parts movable with said support and cooperating parts normally held against movement with the support, said last named parts being adjustable relatively to said support to determine the initial positions of the wipers.

169. In a machine of the class described, the combination with shoe positioning means, of end embracing wipers, a wiper support mounted for movement lengthwise of the shoe, means for closing said wipers inward laterally of the shoe comprising pinions carried by said support and racks engaging said pinions and normally held against movement with the wiper support, and means for adjusting said racks each independently of the other to determine the initial positions of the respective wipers.

170. In a machine of the class described, the combination with end embracing wipers, of means for relatively positioning a shoe and said wipers to cause the wipers to engage the lateral periphery of the shoe and then to be forced across the edge of the shoe bottom by wedging action of the shoe prior to their inward wiping movement over the shoe bottom, and power means automatically operative to impart to said wipers a plurality of reciprocatory wiping movements while maintaining them continuously over the shoe bottom.

171. In a machine of the class described, the combination with overlaying means, of shoe positioning means comprising a hold-down and a cooperating clamping member for engaging the work on the opposite side from said hold-down, a spring for forcing said member toward the hold-down, and means for operating the hold-down while said overlaying means is positioned over the shoe bottom to permit the work to be forced against the overlaying means by the action of said spring.

172. In a machine of the class described, the combination with a wiper and means for operating it to wipe the margin of an upper inwardly over the bottom of a last, of a hold-down for engaging the sole of the shoe on the bottom of the last, spring means tending to force the work toward said hold-down, and means for causing the hold-down to move after the wiper has been advanced inwardly across the edge of the shoe bottom to permit said spring means to force the work against the wiper.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. PYM.

Witnesses:
ANNA M. DORR,
LEWIS E. FLANDERS.

DEFENDANT'S EXHIBIT "C"—Continued.

McFeely patent No. 1,558,737—October 27, 1935, a part of Defendant's Exhibit "C", being the same as Plaintiff's Exhibit No. 1, is not reproduced here. It will be found at the beginning of this volume, commencing on page 1.

DEFENDANT'S EXHIBIT Y-1-A.

(LETTERHEAD OF THE WILLIAMS MFG. CO.)

January 18, 1937.

Toulmin & Toulmin,
Mutual Home Bldg.,
Dayton, Ohio.

Gentlemen:—

I too have been out of the city, and haven't been able to answer your letter relative to the Moenus Heel Seat Lasting Machines which we have here.

The cams upon all of these machines are the identical cams with which they were equipped when they came from Germany. These cams or their attachments have not been changed by us in any way, shape, or form, nor has any one of them ever been changed or replaced by us.

Relative to the screw that goes through the clip at the back of the clamping member or band, I again state that we have never felt this was a very important part of this equipment; some of the screws have dropped out, and in order to eliminate any controversy on this particular item, we have sawed off from each of the leather bands the metal member which was used to attach the leather clamping member by the above mentioned set screw. This entirely eliminates any possible contention upon this score.

Messrs. Ryan & Condon saw this equipment in the identical condition that we use it, and without any change having been made upon any part by us here. Further, this machine is identical to the other machines that we have from Moenus.

Yours truly,

F. L. Williams
THE WILLIAMS MANUFACTURING CO.

FLW*RR

DEFENDANT'S EXHIBIT Y-1-B.

TOULMIN & TOULMIN
DAYTON, OHIO

January 21, 1937.

Mr. F. H. Lyman,
Fish, Richardson & Neave,
84 State Street,
Boston, Mass.

Dear Mr. Lyman:

IN RE: UNITED SHOE MACHINERY CORP. v. WILLIAMS MANUFACTURING CO.

This is in reply to your letter of December 31, 1936. I note from your letter that there is some misapprehension on your part as to the facts. Therefore, the first thing to do is to clear up that misunderstanding in your mind.

The cam structure in the Moenus machines is the same cam structure received in the machines when they came from Germany, and has never been replaced or changed. In the second place the back support for the clamping band has not been utilized.

We have received the following letter from the Williams Manufacturing Company when we asked them to comment on your letter of December 31st. The letter reads:

> "The cams upon all of these machines are the identical cams with which they were equipped when they came from Germany. These cams or their attachments have not been changed by us in any way, shape or form, nor has any one of them ever been changed or replaced by us.
>
> "Relative to the screw that goes through the clip at the back of the clamping member or bank, I again state that we have never felt this was a very important part of this equipment; some of the screws have dropped out, and in order to eliminate any controversy on this particular item, we have sawed off from each of the leather bands the metal member which was used to attach the leather clamping member by the above mentioned set screw. This entirely eliminates any possible contention upon this score.
>
> "Messrs. Ryan & Condon saw this equipment in the identical condition that we use it, and without any change having been made upon

any part by us here. Further, this machine is identical to the other machines that we have from Moenus."

With this background of fact, and the complete elimination of any possible use of the back support for the clamp, we reply to the questions raised in your letter as follows. We can not agree with you as to the infringement of McFeely patent, No. 1,558,737 in connection with claims 6, 84, 85 and 107, but the question is moot in view of the fact that the first McFeely patent, No. 1,129,881, which is practically a duplicate of the second McFeely patent shows precisely everything called for by these claims. We can find no dfference. Of course, we would be glad to have your views as to any difference between the claims in question of the second McFeely patent and the disclosure of the first McFeely patent.

As to claims 21, 22, 27, 28 and 91, each of these claims is limited to the back support for the clamp, which we have not used. The machine has positively been fixed so that no one could use such a back support. These claims also read upon the first McFeely patent which has such a back support as you will observe from Figure 2, Figure 18, Figure 19, Figure 9, et cetera. But here again, the question is moot because we do not use this element which is found in each claim. We have no movable adjusting member connected to the closed or rear end of the clamping member. We have cut off the clip so that your suggestion that the operator could replace the screw at any time would not be correct, because with cutting off the clip, that would not be possible.

With reference to claims 38-41, 47-55, 68-75, 93 and 110, these are on upwipe claims as you correctly say in your letter, and there is no infringement of these claims by the machine which your representatives saw. You are incorrect in your assumption that this cam has been changed. The cam is the same precisely as that received in the machines from Germany. You are perfectly welcome to write the Moenus Company and verify this fact, if you wish to do so. Of course, it is beside the point to say that the cam could be changed. It has never been changed, and as we have no intention of changing it because we do not need to do so, these claims are no longer of any interest.

With reference to the Hoyt patent, No. 1,508,394, in our judgment, there is no infringement, because we do

not have unyielding connections between the operating member and the band for forcing the ends of the band against the shoe. We have a yielding means in the apparatus which provides for a yielding pressing of the shoe, rather than an unyielding pressure. We do not have any means for supporting the band because that has been eliminated with the elimination of the screw.

As to the Pym patent, No. 1,368,968, and claims 168, we do not find any means in our machine operated by the lengthwise movement of the shoe to move the wiper support for closing the wipers inward laterally of the shoe. As you have been kind enough to go into this matter fairly and impartially we believe it is equally due you to advise you of the prior art defenses we would rely upon which we believe clearly anticipate your claims irrespective of the fact that we believe we do not infringe.

The two McFeely patents, the one you rely upon and the earlier one that has expired, are virtual duplicates. Even the drawings are so much alike that only one saturated with the subject can tell them apart. The slight mechanical differences between the two patents which can be observed only upon a very careful study of the patents amount to no more than the substituting in the second patent of features old in the art which appear in the first patent. You are familiar with the recent case in the Supreme Court of the United States in which this method of trying to extend a monopoly of an earlier patent by a later patent was condemned. The Supreme Court said:

> "The question then is whether, by this method, the patentee, by improving one element of an old combination whose construction and operation is otherwise unchanged, may, in effect, repatent the old combination by reclaiming it with the improved element substituted for the old element. That this cannot be done is shown by numerous cases in this and other federal courts.[4]
>
> "'[4]Edison Electric Light Co. v. Peninsular Light P. & H. Co., 101 Fed. 831; Heald v. Rice, 104 U. S. 737, 755; Underwood v. Corber, 149 U. S. 224, 227, 229; Morgan Envelope Co. v. Albany Paper Co., 152 U. S. 425, 431, 432; Carbice Corporation v. American Patents Development Corporation, 283 U. S. 27, 31, 32; Wagner Typewriter Company v. Webster Co.,

144 Fed. 405, 409; Langen v. Warren Axe & Tool Co., 184 Fed. 720; Harvey-Hubbell, Inc. v. General Electric Co., 267 Fed. 564; Troy Wagon Works Co. v. Ohio Trailer Co., 274 Fed. 612; General Electric Co. v. Ohio Brass Co, 277 Fed. 917; Radio Corporation v. Lord, 28 F. (2d) 257; Wall Pump & C. Co. v. Gardner Governor Co., 28 F. (2d) 334"

Bassick Manufacturing Company v. The R. M. Hollingshead Company; G. S. Rogers v. Alemite Corporation, 298 U. S. 415.

In our opinion, not only are your claims of the second McFeely patent anticipated by the first McFeely patent, but they are also anticipated by your own Pym patent, which was filed nine months earlier than the McFeely patent. Furthermore, the following patents anticipate your McFeely patent; German patent No. 293,626, with a priority of June 1911; U. S. patent No. 1,030,847; Bayard patent No. 1,068,843; Russell patent No. 1,033,946 of 1912; Plant reissue No. 13,507 of 1913; Brock patent No. 1,197,437 of 1916; German patent No. 90,388 of 1894 to Ferguson; Plant patent of U. S. No. 958,280; Snow reissue No. 13,292; Merrick patent No. 1,245,117; reissue No. 13,718; No. 1,135,945; British patent No. 13,947 of 1912; reissue No. 13,505 of 1913; No. 1,188,616; No. 524,445 of 1894.

With particular reference to the rear support of the heel clamp we refer you to Keyes, No. 1,023,854; German patent No. 248,247 of 1910; Baxter No. 1,171,383, Figure 5; Brock No. 1,188,617; Chapelle No. 1,168,011 of 1913; Brock No. 1,030,562; Russell No. 1,132,978, Figure 2; Brock No. 1,002,818, Figure 1; Snow No. 946,708; Lombard No. 524,445, Figure 2; Stiggens No. 935,065; King No. 672,624; Grandy No. 588,569; Stiggens No. 1,132,630, Figure 1; Brock 1,284,870, Figure 4; Stiggens No. 1,104,016, Figures 2 and 3.

With reference to your Hoyt patent No. 1,508,394, we find that Hoyt is anticipated by both McFeely patents, Nos. 1,129,881 and 1,558,737, by Pym No. 1,368,968 and by the following patents; Stiggens No. 236,066 of 1909, Figure 2; Brock No. 1,197,439, Figures 3 and 4; Stiggens No. 974,282; Snow No. 946,708, Figure 2; German No. 325,624 of 1918 taken out by Moenus; German No. 359,193 of June 1911, taken out by United Shoe Machinery Corporation; Ray patent No. 669,231, Figure 2; and British patent 451 of 1915, Figure 2.

Defendant's Exhibit Y-1-B.

We would be very glad to go over these matters together and elaborate our position more fully if you so desire. As we now view the matter, we can not see any infringement, and we find your patents are invalid as to the claims in question. We sincerely trust that this matter may be adjusted in some fashion that will not impose upon our client or yours the expense of litigation, and which will not result in defeating your patents, as our client has no desire to disturb your patent situation in any way. I think you understand that friendly attitude.

If you desire to talk over this matter, I am at your service.

Very truly yours,

DEFENDANT'S EXHIBIT Z-1.

(LETTERHEAD OF THE WILLIAMS MFG. CO.)

February 9, 1938.

Toulmin & Toulmin,
Mutual Home Bldg.,
Dayton, Ohio.

RE: UNITED v. WILLIAMS

Gentlemen:

We removed the springs referred to in our previous correspondence from the fourth heel seat tacker which we have in operation, yesterday, February 7th.

After operating three machines without the springs and one machine with the springs since about December 28th, we found absolutely no difference in the results obtained, either in the operation of the machine or the operation performed.

Yours truly,

B. T. Gialdini
THE WILLIAMS MANUFACTURING CO.

B. T. Gialdini,
EC

PLAINTIFF'S EXHIBIT 9.

December 17, 1935.

Albeko Shoe Machinery Corporation,
710 Broadway,
New York, N. Y. REGISTERED

Gentlemen:

On behalf of our client, United Shoe Machinery Corporation, we hereby notify you of your infringement of our client's patents as follows:

McFeely patent No. 1,558,737, October 27, 1925;
Hoyt patent No. 1,508,394, September 16, 1924;
Pym patent No. 1,368,968, February 15, 1921.

Said infringement is by reason of your sales of and activities with the so-called Moenus heel seat lasting machine No. 1224 which you have been importing. We find this machine to be a very clear and comprehensive infringement of our client's patents. For your convenience we call your attention to claims of the patents which we find to be infringed as follows:

McFeely patent, claims 6, 21, 22, 23, 24, 26, 27, 28, 38, 39, 40, 41, 45, 47, 48, 49, 50, 51, 52, 53, 54, 55, 68, 69, 70, 71, 72, 73, 74, 75, 84, 85, 91, 92, 93, 107 and 110;
Hoyt patent, claims 19, 20, 21 and 22;
Pym patent, claim 168.

We must request that you immediately desist from all further importation of said machine, that you make no further disposition of such infringing machines by sale or otherwise, stopping all further efforts in that direction, and that you arrange to withdraw such infringing machines as you have already put out. Otherwise it will be necessary for us to bring suit against you for an injunction and an accounting.

Kindly let us have your reply very promptly.

Yours very truly,

3. The "Calzera" automatic heel seat laster No. 1224.

This is an excellent machine for the important operation of seat lasting. The total seat is done by one single stroke. The drawbacks of the previous lasting methods have been fully eliminated, and a better work can be done to meet the more exacting requirements. The difference between the old and the new method is this. On the ordinary consol laster the tacks could be driven in at the seat one by one only. The wiper could not press the margin of the upper firmly enough upon the insole, and the pincer pull was thus paralysed. It took 14 to 20 separate strokes to last one seat. Lining, upper and counter were not sufficiently moulded to the last and even a heavy pounding could not make good the lacking moulding.

How perfect on the other hand is the seat lasting done on the "Calzera". This machine combines two operations in one.

1. It shapes the seat portion exactly to the last by the aid of a heel band, wipes the upper twice under a strong pressure by means of wiper plates and presses the margin of the upper flat upon the insole.
2. The required number of tacks is driven in automatically with one stroke at equal distances, in the same direction and to equal depth. The wiper plates have openings through which the tacks are driven, while the lasted over margin is still firmly held by the wiper plates. There are no more crooked tack heads, cross driven or wasted tacks.

The contours of the last are rightly reflected by the shoe and a good fitting is ensured.

The result is astonishing:

1. The heel portion is perfectly shaped by the wipers.
2. Last edge of unsurpassed beauty and distinction is obtained, providing the base for good heel fitting.
3. The entire heel portion hugs the last closely and an accurate fitting is ensured. Treading the counter down during wear is fully eliminated.
4. Seat pounding becomes superfluous to a great extent.

Are these not long wanted advantages?

The "Calzera" heel seat laster is used:

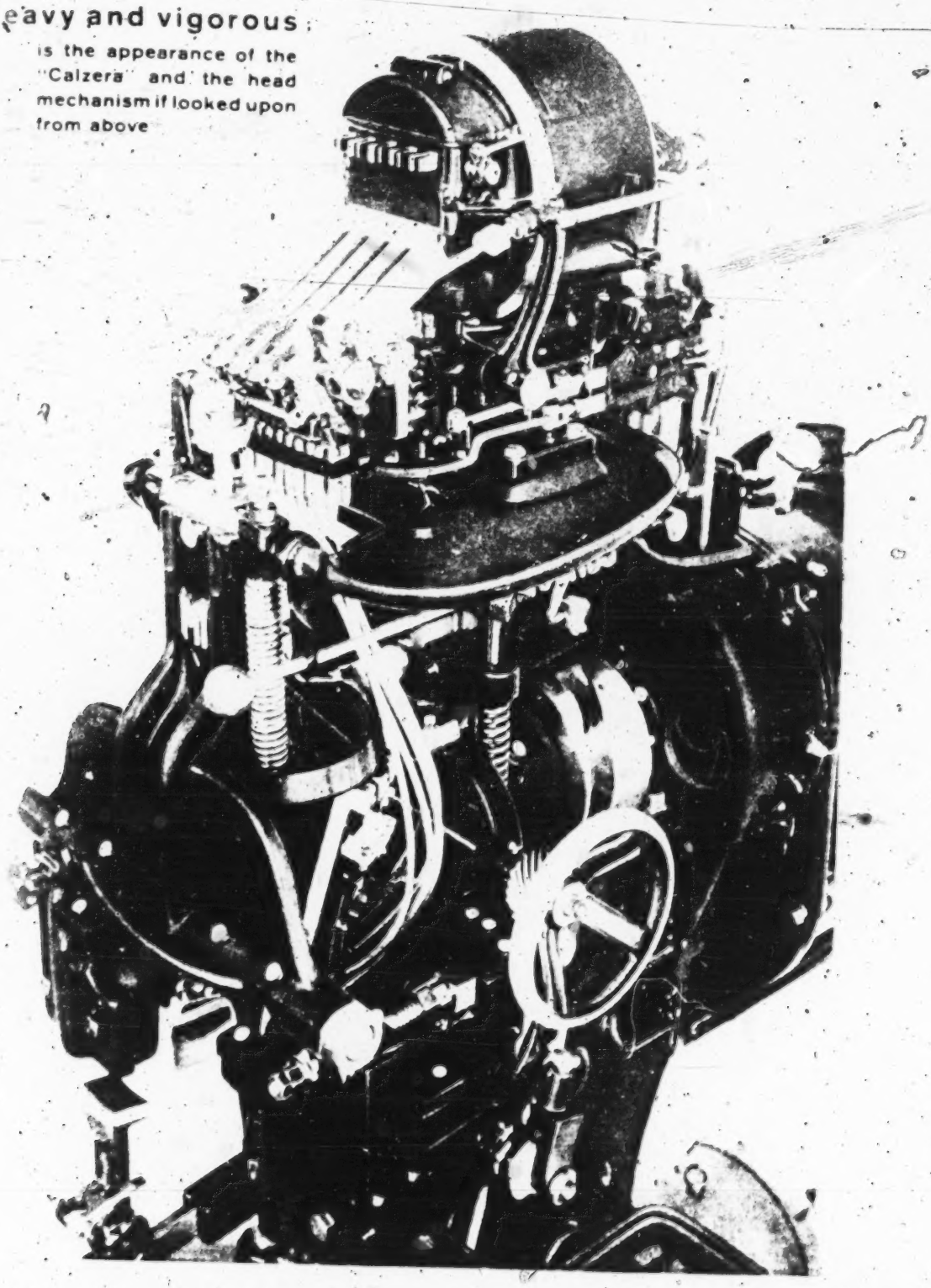
1. for any size and kind of shoes, from the smallest children's size up to the largest men's,
2. for the lightest as well as for the heaviest footwear,
3. for leather of any grade, but just as well for canvass or camel hair uppers,
4. for welted, machine sewn, wood pegged, stu[illegible]on and screwed work and their varieties,
5. for boots and shoes of any kind.

Normally we fit the machine with ordinary jack. However, on request it is also delivered with long jack for high leg boots.

The nailing is self-acting. There are always separated from the tack drum so many tacks, as are required for the respective shoe: for children's and youth

Heavy and vigorous

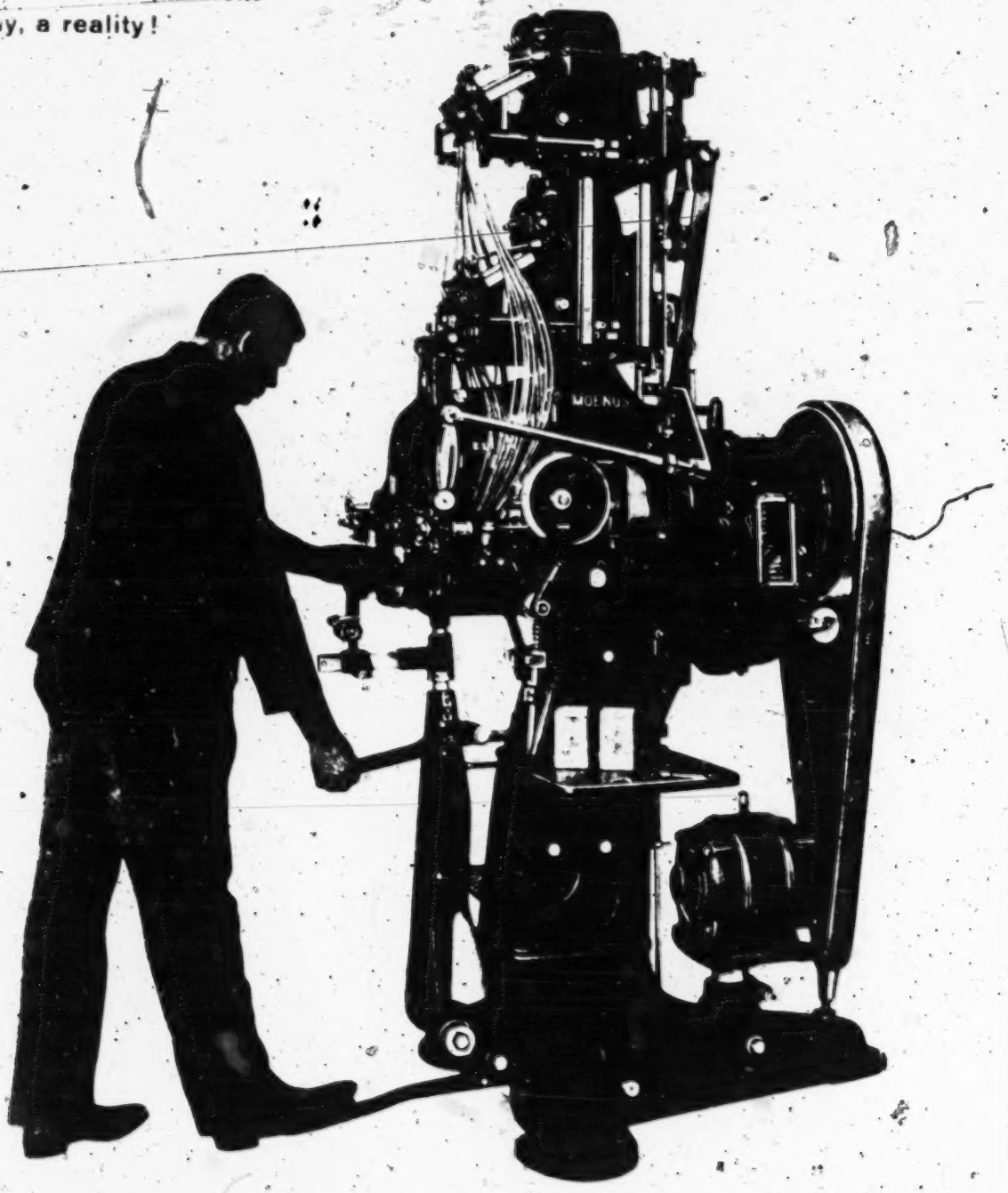
is the appearance of the "Calzera" and the head mechanism if looked upon from above



The eye sees a masterly creation of engineering

PLTFF'S EX.
10-A

But a few years ago
a problem —
today, a reality!



...e wiping and nailing of the entire heel seat done by two rotations of the machine

As shown by the picture, we now deliver the „Calzera" also with two tack apparatusses (for two different lengths of tacks)

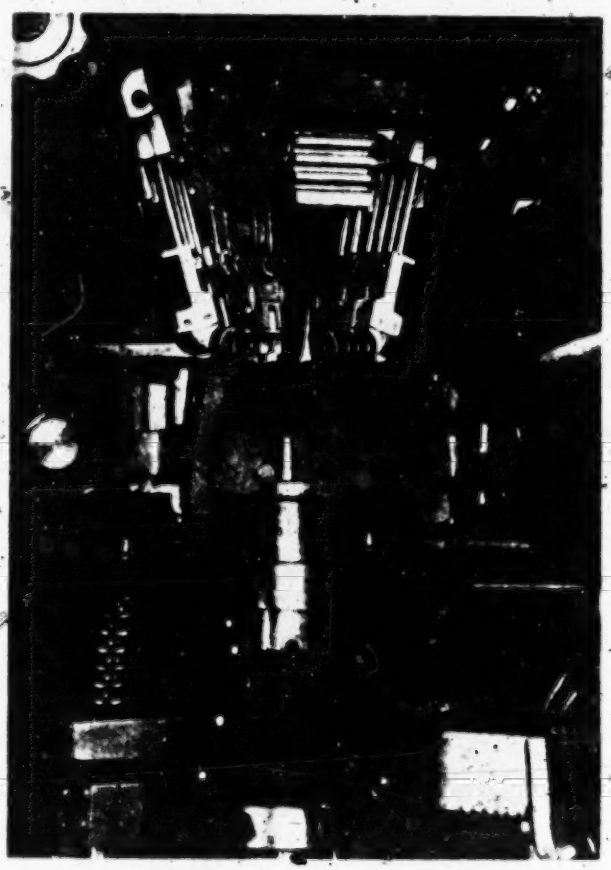
mostly 12 to 14 tacks for ladies, 14 to 16 and for men's size 10 to 12 in large cases also 20 tacks. A simple switching over will set the machine to a different number of tacks.

In factories where the class of the shoes varies widely, the machine is usually delivered with **a second tack drum** against extracharge. The merit of this second tack drum is, that two different lengths of tacks can be used on the machine without having to empty the tack drum frequently, in order to refill it afterwards with the size just needed.

The advantages of the "Calzera" as compared with the ordinary consol laster are extraordinarily good work and a much higher efficiency with the resulting savings in wages, power and floor space. Generally speaking one "Calzera" machine when being fully utilized will do, as a standard, from 1600 to 2000 pairs daily, so that it does replace at least 3 consol lasters if these are exclusively used for seat lasting.

As striking as the enormous capacity is **the quality work obtained. The** action of the "Calzera" has stood the test in every factory. A heavy or stiff upper and counter is wiped over by the machine as easily as if it were made of linen. The man on the consol tacker could never reach a lasted shape of perfect flatness on such heavy stock, even trying his hardest to press the heavy plates down to the inside. He naturally had not so much time as the automatic machine has and besides, the positive wiping action. The work on the seat and different parts so according to the last that can be mostly with a light corand will do. Owing the lining and consesmall but a perstress on the footwear.

ovement in the conof the shoe was the regular reason shoe manufacthe "Calzera" the piecework wages are to be separate equit



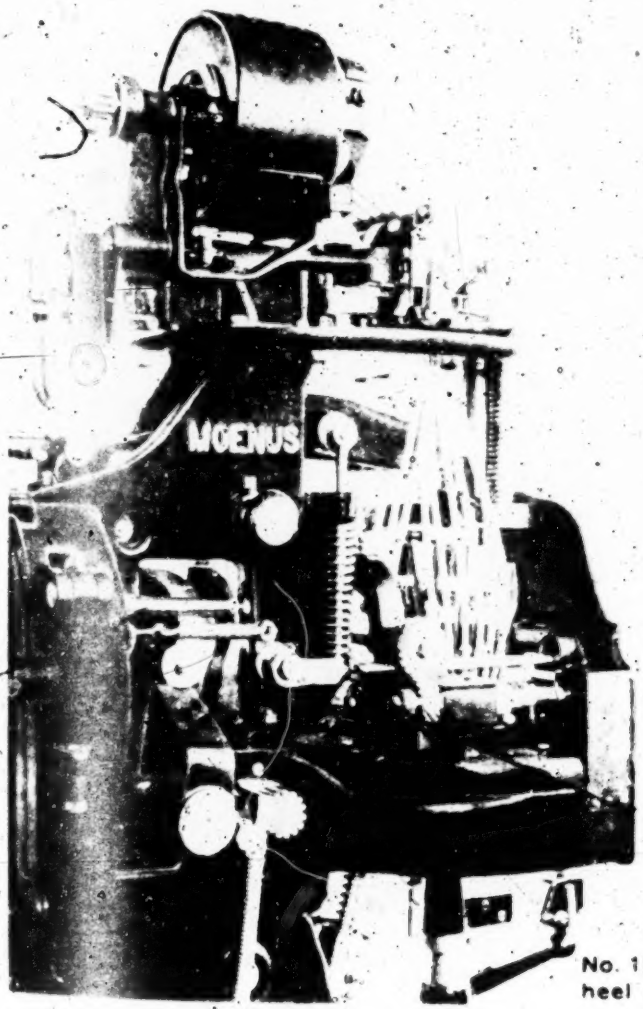
like many skilled fin- the wiper plates shape terial at the heel seat last under a strong whilst the heel band upper firmly

A machine that impresses everybody!

The imposing appearance of the "Calzera" together with the possiblity to force and set the entire seat in one operation demands respect and surprise. There is no doubt that the "Calzera" is the joy and the pride of every factory.

What factories use the "Calzera" to advantage?

It is quite evident from the foregoing that the use of the "Calzera" seat laster is not limited to those factories with a mass production or those which dispose of much money. This machine is rather used to advantage also by factories with medium capacity, even down to a daily production of 300 pairs. Possibly just those medium factories derive the biggest profit from this machine, which helps them to increase their capacity, to improve the quality of their products and also to reduce the manufacturing costs. For these reasons the "Calzera" can not more be regarded as something that can be dispensed with. The price of the machine is not prohibitive, so that the majority of the shoe factories can afford to buy the "Calzera" seat laster. The machine is not a privilege for the large manufacturer. Many small factories, which bought the "Moenus" seat laster, did never regret it or have ever complained about any point. We are sure that once the machine has been started in your factory, you would not like to miss it again, on the contrary you will become enthusiastic of the machine and its enormous capacity.



No. 1224 "Calzera" automatic heel seat laster — side view

PLAINTIFF'S EXHIBIT 12-A.

(LETTERHEAD OF ALBEKO SHOE MACHINERY CORPORATION)

January 30, 1936.

United Shoe Machinery Corp.
140 Federal Street
Boston, Mass.

Gentlemen:

With reference to the Heel Seat Lasting Machine, on which you claim an infringement on some of the patents, Mr. Bruno Kath, patent adviser of Maschinenfabrik Moenus A.G., is at present in New York and would like to discuss the matter with you.

Mr. Kath will call on you Monday morning, February 3rd., and we hope this will be agreeable.

Yours very truly.

ALBEKO SHOE MACHINERY CORP.
By Herman Schwaley

HS.F.

PLAINTIFF'S EXHIBIT 12-B.

January 31, 1936.

Albeko Shoe Machinery Corporation.
710 Broadway
New York City, New York

Dear Sirs:

MOENUS HEEL SEAT LASTING MACHINE

Your letter of January 30, 1936, has been received. We shall be glad to see Mr. Bruno Kath on Monday morning, February 3. If upon arriving at our offices he will ask for the writer in Room 1022, we will see that he meets the right people.

Very truly yours,

UNITED SHOE MACHINERY CORPORATION
Patent Department
By Victor Cobb (Signed)

VC:OBH

PLAINTIFF'S EXHIBIT 12-C.

February 5, 1936.

Mr. Bruno Kath, Patent Engineer
Moenus Maschinenfabrik A. G.
Frankfurt, A.M., Germany

Dear Mr. Kath:

MOENUS HEEL SEAT LASTING MACHINE

We have recently discussed with you the patent infringement situation existing by reason of the installation in the United States, of Moenus Heel Seat Lasting Machines. This situation is set forth more fully in the letter of December 17, 1935, from our counsel, A. D. Salinger, Esq., to the Albeko Shoe Machinery Corporation. You have this morning shown us a cable which you construe as indicating the intention of your firm to remove all the heel seat lasting machines of the type in question from the United States. "All the machines" we understand to mean all such heel seat lasting machines whether in the possession of your company, Albeko, or others. If you will confirm this by a suitable letter and promptly remove all the machines from the United States, we will drop the infringement charge.

Very truly yours,

UNITED SHOE MACHINERY CORPORATION
Patent Department
By Victor Cobb (Signed)

VC:OBH

PLAINTIFF'S EXHIBIT 12-D.

(LETTERHEAD OF THE MOENUS COMPANY)

28th February, 1936

Messrs. United Shoe Machinery Co. Ka/Kfm.
140 Federal Street
Boston, Mass.
USA.

Gentlemen,

RE HEEL SEAT LASTING MACHINE

We beg to revert to your letter of the 5th inst. addressed to our Patent Engineer, Mr. Bruno Kath, and beg to thank you for the reception you have given Mr.

Plaintiff's Exhibit 12-D.

Kath and for the opportunity afforded to him of discussing in a friendly way the patent infringement situation which has arisen in respect of our above machine.

We herewith beg to confirm the informations which Mr. Kath has given you, that we will remove all our heel seat lasting machines of the type in question from the United States, whether these machines are in possession of our company, our representatives, or others. We have already taken the necessary steps to this effect and thereby complied with your demand.

Yours very truly,

MASCHINENFABRIK MOENUS A. G.

PLAINTIFF'S EXHIBIT 12-E.

Sent after consultation
with Mr. H. A. Osborne and
with his approval.
V.C. 3/11/36

March 11, 1936

Maschinenfabrik Moenus A. G.
Frankfurt, A.M., Germany

Dear Sirs:

MOENUS HEEL SEAT LASTING MACHINES

We have just received your letter of February 28, 1936, regarding the above. We wish to thank you for the assurances which you have given us that you will remove all your heel seat lasting machines of the type in question from the United States, whether these machines are in the possession of your company, your representatives or others, and that you are already taking the necessary steps to this effect.

As the writer told your Mr. Bruno Kath when he was here last month, we have received a report, in which we have considerable confidence but as to the accuracy of which we cannot be entirely certain, that several of these heel seat lasting machines of your manufacture were in the factory of the Williams Manufacturing Company at Portsmouth, Ohio. We are of course relying upon you, if it is a fact that such machines are in the Williams Company factory, to make arrangements which will result in the withdrawal of those machines, as well as all other Moenus heel seat lasting machines of the type in question, from the United States.

Plaintiff's Exhibit 12-E.

We will expect to hear from you again as soon as all the machines in question have been removed from this country and will appreciate a definite statement as to the Williams Manufacturing Company situation.

Very truly yours,

UNITED SHOE MACHINERY CORPORATION
Patent Department
By Victor Cobb (Signed)

VC:OBH
IW

PLAINTIFF'S EXHIBIT 12-G.

(LETTERHEAD OF THE MOENUS COMPANY)

United Shoe Machinery Corporation
Patent Department
140 Federal Street,
Boston, Mass.

September 4, 1936.

Dear Sirs,

RE: HEEL SEAT LASTING MACHINE PATENTS

This is a cursory reply to your letter of March 11th. We just wish to inform you that we are in communication with our customers in the United States regarding the return of our heel seat lasting machines to us. Our customers have a few queeries for us to attend, as naturally our demand to return the machines is an unpleasant surprise to them; but there do not appear to be any serious obstacles and we are confident that the removal of the machines from the United States will be a matter of a comparatively short time.

Yours very truly

MASCHINENFABRIK MOENUS A. G.

PLAINTIFF'S EXHIBIT 12-H.

July 2, 1936.

Maschinenfabrik Moenus A. G.
Frankfurt, A.M., Germany

Dear Sirs:

INFRINGEMENT OF UNITED SHOE MACHINERY CORPORATION PATENTS BY MOENUS HEEL SEAT LASTING MACHINE

Under date of February 28, 1936, after we had discussed with Mr. Bruno Kath the situation presented by the infringement of our patents by your heel seat lasting machine, you wrote us:

> "we will remove all our heel seat lasting machines of the type in question from the United States, whether these machines are in possession of our company, our representatives, or others. We have already taken the necessary steps to this effect and thereby complied with your demand."

Under date of April 9, 1936, you wrote us:

> "there do not appear to be any serious obstacles and we are confident that the removal of the machines from the United States will be a matter of a comparatively short time."

We have recently been informed that the Williams Manufacturing Company, of Portsmouth, Ohio, U. S. A., is still using several heel seat lasting machines of your manufacture. You will remember that our dropping of the infringement charge sent by our attorney to Albeko Shoe Machinery Corporation on December 17, 1935, was conditional upon your prompt removal from the United States of all infringing machines, whether in the possession of your company, Albeko or others (see our letter of February 5, 1936, to Mr. Bruno Kath).

We have heard nothing from you since your communications referred to above. Under these circumstances, we must ask that you send us at an early date a statement of the number of the infringing machines still outstanding in this country, with the names and addresses of the users of those machines, together with a state-

Plaintiff's Exhibit 12-H.

ment as to your plans for bringing about their removal from the United States.

Very truly yours,

UNITED SHOE MACHINERY CORPORATION
Patent Department
By Victor Cobb (Signed)

VC:OBH

Note: The above was written after consultation with Mr. H. A. Osborne. It has been approved by Mr. H. G. Donham.

V. C.

PLAINTIFF'S EXHIBIT 12-I.

(POSTAL TELEGRAPH)

NA61 18 CABLE—N FRANKFURTMAIN 20 0838
HOWPAT—
BOSTON—
(Harlow M. Davis
United Shoe Machinery Co.,
Room 1022, 140 Federal Street)

Your letter second instant customer has already promised return machines we are calling him simultaneously—

—MOENUS.

H. A. OSBORNE
Jul 27 1936

PLAINTIFF'S EXHIBIT 12-J.

(LETTERHEAD OF THE MOENUS COMPANY)

Ka/Kfm. 20th July 1936

Messrs. United Shoe Machinery Coropration
Patent Department
140 Federal Street
Boston, Mass.
USA.

Dear Sirs,

RE INFRINGEMENT OF UNITED SHOE MACHINERY CORPORATION PATENTS BY MOENUS HEEL SEAT LASTING MACHINE.

We received your letter of the 2nd inst. You will understand that our customer has found himself in an

Plaintiff's Exhibit 12-J.

unpleasant position having to give up the use of the heel seat lasters. We had some lengthy correspondence with him over the patent position as naturally he had to be satisfied that your allegations are correct before he could decide to give up the machines. Meanwhile he has agreed to return the machines to Frankfurt and although we have not yet received the information of the machines having actually been dispatched, we presume that the delay is only due to his having to make extensive arrangements to meet the new situation.

We have cabled to our customer to-day and have no doubt that we shall get a satisfactory reply, the gist of which will be communicated to you. Meanwhile we would ask your indulgence for another short time. If no satisfactory reply should come forth we will then give you the informations you required from us. As a cursory reply to your letter we have cabled you to-day as follows:

"your letter second instant customer has already promised return machines we are cabling him simultaneously."

Yours faithfully,

MASCHINENFABRIK MOENUS A. G.

PLAINTIFF'S EXHIBIT 12-K.

(LETTERHEAD OF THE MOENUS COMPANY)

Ka./SCH. 27.7.36.

Messrs. United Shoe Machinery Corporation,
140 Federal Street,
Boston, Mass. U.S.A.

Dear Sirs:

RE: PATENTS, HEEL SEAT LASTING MACHINE

In further reply to your letter of the 2nd inst. we beg to inform you, that we have received a cable from our customers, in which they notify us that they were communicating with you directly.

In view of this communication we have no further hesitation [sic] in confirming you that your anticipation of our customers being the Williams Manufacturing Company, of Portsmouth, Ohio, is correct. At the same time we beg to emphasize that the heel seat lasters sup-

Plaintiff's Exhibit 12-K.

plied to this firm are the only machines of the kind complained of supplied by us in the United States. There are no others in use nor are there any being offered with our knowledge or consent.

We hope that an agreement will be reached between you and Messrs. Williams and whatever arrangement you may come to it will settle the question of the last and only heel seat lasting machines of our production which are still in use in a United States shoe factory.

After you have come to an understanding with Messrs. Williams we should appreciate a letter from you to the extent that the matter has been settled.

Yours very truly,

MASCHINENFABRIK MOENUS A. G.

PLAINTIFF'S EXHIBIT 12-L.

Maschinenfabrik Moenus A. G.
Frankfurt a. Main
Germany

March 26, 1937.

Gentlemen:

WILLIAMS MFG. COMPANY—PORTSMOUTH, OHIO.
INFRINGEMENT OF UNITED SHOE MACHINERY CORPORATION'S PATENTS BY MOENUS HEEL SEAT LASTING MACHINE.

Since receiving your letter of July 28, 1936, we have communicated at length with the Williams Mfg. Company but have not been able to reach a satisfactory agreement with them. With reference to this matter, will you please inform us if we are correct in understanding that you requested the Williams Mfg. Company to return to you the Heel Seat Lasting Machines of your manufacture and offered to pay the Williams Company what they had paid for the machines.

Very truly yours,

UNITED SHOE MACHINERY CORPORATION
Patent Department
By Victor Cobb (Signed)

TJR:IW

PLAINTIFF'S EXHIBIT 12-M.

(LETTERHEAD OF THE MOENUS COMPANY)

Ka./Sch. 13.4.37.

Messrs. United Shoe Machinery Co.
140 Federal Street
Boston, Mass.

Gentlemen:

RE: WILLIAMS MFG. CO., PORTSMOUTH. HEEL SEAT LASTING MACHINE PATENTS.

Replying to your letter of the 26th ult. we regret to note that no satisfactory agreement has as yet been reached between yourselves and Messrs. Williams Mfg. Co. With respect to the question contained in your letter we beg to confirm that we have requested the Williams Mfg. Company to return to us the Heel Seat Lasting Machines, which we supplied to them, against certain compensations the extent of which we do not consider ourselves entitled to state without the consent of Messrs. Williams.

We hope, however, that this information will serve your purpose and are

Yours very truly,

MASCHINENFABRIK MOENUS A. G.